

A DICTIONARY OF PRACTICAL MEDICINE.

GALL BLADDER AND DUCTS.—SYN.

Biliary Passages; Channels of the Excretion of Bile. La Vesicule et les Canaux du Fiel; Les Voies d'Excretion de la Bile, Andral. Die Gallenblasse, Die Gallengang, Germ.

CLASSIF.—GENERAL PATHOLOGY—*Morbid Structure*: SPECIAL PATHOLOGY.

1. The intimate connection, anatomically and physiologically, existing between the liver—the organ secreting the bile, and the digestive canal—the organ for whose functions the bile is chiefly destined, necessarily involves the passages which convey it from the former into the latter, as well as the reservoir of this secretion, in many of the diseases seated in either the one or the other. The affections of the liver, whether functional or structural, are thus often extended to the gall-bladder and ducts; and those of the stomach and duodenum not infrequently proceed in an opposite direction, to the same parts. But the bile itself may excite disease, in the parts through which it passes, and in which it is for a time retained. It will, however, be necessary to take a view of the alterations observed of this secretion, before noticing the effect they sometimes produce in the biliary passages.

I. OF THE ALTERATIONS OF THE BILE.

2. The changes of the bile have been found independent of any alteration in the liver, or in the gall-bladder or ducts; and, in most of the lesions of these parts, the bile has been unaltered in appearance, or in quantity, and most probably also in quality. It would seem, therefore, that the most apparent and the most serious lesions of the liver, are not always those which most derange the secreting action of this organ. The conditions which most affect the state of this fluid are such as are either beyond our powers of observation, or seated in the blood. Indeed, there is every reason to suppose that the liver performs, as I many years ago argued in another work, an eliminating function as respects the blood; and that it separates elements from this source, which would be injurious if allowed to accumulate, and elaborates them into a secretion necessary to digestion and assimilation. Alterations in the quality and quantity of the bile, therefore, in a great measure depend upon the blood, and upon the quantity of those constituents which the liver eliminates from this fluid and elaborates into this peculiar secretion.

3. *A.* The only alterations which can be detected in the bile upon simple inspection, are differences in colour and in consistence.—*a.* It presents every shade of colour, from a whitish pale straw

colour, to the deepest black. The lightest tints have been most frequently observed in cases of anæmia, or chlorosis, or where the blood has been thin, watery, pale, or devoid of red particles—the liver being small, pale, and containing little blood. The dark colour is most common where the blood is thick, dark, or black, and abundant; and when the liver is congested, and the biliary passages loaded with bile.—*b.* The consistence of this secretion varies from the fluidity of water, to the thickness of half-melted glue, or of tar, or even of pitch. The deeper its colour, the greater is its consistence; but there are numerous exceptions to this.

4. *B.* Chemical analysis shows that the constituents of the bile vary greatly in their proportions. As the liver approaches more completely to the fatty condition, the more entirely is the bile deprived of its resinous elements. It sometimes, particularly in cases of fatty liver, consists chiefly or almost entirely of water and albumen. In other instances, the yellow matter, the resin, or the cholesterine is the predominant principle. It is this change in the proportions of the component parts of the bile that gives rise to its consistence, as well as to *Biliary CONCRETIONS* (see that article).

5. *C.* Physiological experiments, and various diseases, evince material alterations in the qualities of the bile. This secretion, taken from some dead bodies, produces no other inconvenience, when introduced into a living animal, than a slight local irritation; whilst that taken from others occasions much more serious consequences, and even death itself. In some cases it may be tasted with impunity; in others it produces pustules, ulcers, or vesications on the tongue and lips. It has been observed, in dissections of persons who have died of pestilential yellow fever (see *PESTILENCE*), that the bile has excited a painful or burning sensation, followed by excoriation of such parts of the examiner as had come in contact with it. A similar effect is not infrequently produced in the rectum, and around the anus, from the passage of bile which has been long retained and accumulated in the biliary passages. Numerous other proofs of an increased acrimony of this fluid, arising either from the state in which it is secreted, or from changes that have taken place in it during its retention, might be adduced, if they were required.

6. From these considerations it may be inferred—(*a*) that accumulations of this secretion, in either the gall-bladder or ducts, will arise from impaired contractility, or from mechanical obstruction at the outlets, or from the viscid or morbid state of the secretion itself;—(*b*) that the bile itself will some-

times occasion very serious disease in the gall-bladder or ducts, owing to an acrimony acquired by it in the way just stated (§ 2.);—and (c) that, when the bile is thus accumulated or retained, as well as altered in quality, the consequent disorder, either in the biliary passages, or in the digestive canal, when it has reached the latter situation, will be the more severe.—The difficulty, however, of forming a correct opinion as to the complaint, when the gall-bladder or ducts are its seats, should not be forgotten; for, owing to the relations noticed above (§ 1.), it often is impossible to distinguish disease of either the one or the other, from that of the liver or duodenum, unless the passage of bile into the intestines is altogether interrupted; and even then the exact nature and extent of lesion are equally difficult of recognition.

II. INACTION OF THE GALL-BLADDER AND DUCTS.—*Accumulation of Bile in the Gall-bladder and Ducts from local Asthenia.*

CLASSIF.—I. CLASS, I. ORDER (*Author*).

7. CHARACT.—*Fulness, weight, or uneasiness in the epigastrium and hypochondrium; flatulence or symptoms of dyspepsia; a pale, slightly lurid, or muddy complexion; scanty or morbid excretion of bile in the stools, frequently with debility and depression of mind.*

8. i. When the functions of the liver, or those of the stomach and duodenum, are impaired, the gall-bladder and ducts necessarily participate in the disorder; and the bile is liable to accumulate in them.—The accumulation may arise from one or more of the following conditions:—1st. Impaired tonic contractility of the coats of the gall-bladder, and perhaps also of the ducts.—2d. A congested or tumefied state of the mucous membrane at the outlet of the common duct, and in the duodenum.—3d. Inspissation of the bile in the gall-bladder and ducts, from the morbid state of the secretion, or from the absorption of its more fluid parts, whilst retained in these situations.—4th. Spasm of the ducts themselves:—and, 5th. Temporary or constant occlusion of the ducts from inflammation, or from the presence of biliary calculi, either in them or in the gall-bladder.

9. A. The first of these pathological states is of frequent occurrence, in a moderate degree. When the contractility of the coats of the biliary passages, or of the gall-bladder, is impaired, in connection with torpor of the liver, and debility of the stomach and duodenum, the bile is imperfectly excreted, or it accumulates in these situations. The consequent distension, or the irritating properties the bile acquires by the retention, or some other cause, excites the contractility of these parts, and occasions the collected secretion to be thrown into the duodenum, where it produces more or less disorder, owing to its acidity, and to the very intimate and extensive relations of this intestine with the rest of the œconomy. When the bile has thus accumulated, a very gentle aperient will often be the cause of a violent action on both the stomach and bowels; this secretion, particularly if rendered acrid by long retention, and by the influence of temperature or season, giving rise to all the characters of bilious cholera, when its rapid flow into the duodenum has been thus procured.

10. B. That congestion, or a tumefied condition,

of the mucous membrane of the duodenum will occasion accumulations of bile in the ducts and gall-bladder, is at least extremely probable; for the aperture of the common duct in this viscus being thereby narrowed, a diminished discharge of bile into it will result, particularly if this secretion be thicker or more viscid than natural.—In cases, therefore, of acute or chronic duodenitis, or of irritation of the internal surface of the duodenum, particularly if there also exist spasm either of this viscus or of the common duct, an impeded or interrupted flow of bile into the digestive canal, with consequent accumulation of it throughout the biliary passages, with or without jaundice, will very generally supervene. (See art. DUODENUM, § 12.)

11. C. That the bile becomes inspissated and often more acrid, by retention in any of its passages, may likewise be conceded. The fact is even demonstrated, not only by observation during the life of the patient, but also by the appearances after death. In such cases, it is with some difficulty that the secretion can be forced along the ducts, or from the gall-bladder along the cystic canal. In an inactive state of the liver, the hepatic ducts are unable to discharge the bile which passes into them; and this fluid, during its collection and retention, is liable to be partially absorbed. Owing to this absorption, or to the state of the secretion at the time of its production, or to both, inspissation, viscosity, and increased acrimony of it may take place before it passes out of the liver, or reaches the larger ducts or gall-bladder; and even concretions may form in it from the same circumstances, in any of these situations. (See art. CONCRETIONS—*Biliary*.)

12. D. Spasm of the common or cystic duct may give rise to retention, and be followed by the same series of changes as have been just mentioned; but the evidence of the occurrence of spasm is much less complete than that of the other pathological states. It seems, however, probable that the passage of an acrid secretion along the cystic and common ducts, will so irritate them as to give rise to spastic constriction of them. This effect is produced upon other canals by irritating matters; and it may therefore be inferred, that a similar result will accrue in this situation from the operation of these agents. That it does occasionally take place, has been demonstrated in some instances by *post mortem* inspections.—That inflammation of the ducts is often followed by accumulation of bile in the gall-bladder and hepatic ducts, will be shown hereafter; it may, however, be stated, that a persistence, or a higher grade, of the same cause—the acidity of the bile—as sometimes occasions spasm or constriction of the ducts, will even induce inflammation of them and its consequences.—It has been often found, upon examination after death, that collections of bile have arisen from tumours, or morbid enlargements of the pancreas, pressing upon, or even obliterating, the ducts, particularly the common duct. Several instances of this kind have occurred to me in practice. That biliary concretions, in the common, the cystic, or the hepatic ducts, often produce similar effects, is a sufficiently established fact in pathology.

13. ii. The symptoms of accumulations of bile in

the gall-bladder and ducts from impaired action are — fulness and uneasiness in the epigastrium, extending to the right hypochondrium, sometimes attended by a sense of weight, distension, and of coldness in the pit of the stomach, and by pain or uneasiness about the lower angle of the shoulder blades; flatulency, oppression, or acidity of the stomach; a pale or sallow complexion; a dark circle around the eyes; a loaded, pale, or yellowish tongue; diminished clearness of the skin; a soft, slow, weak, or languid pulse; lassitude or debility; inability of exertion; constipation, colicky pains, or an irregular state of the bowels with deficiency of bile in the stools; loaded or dark urine, with a more or less copious sediment; occasionally pain in the eyes and forehead; and mental depression, with disinclination to mental or physical employment.

14. iii. *Complications.* — This complaint may be symptomatic of other affections, particularly of those already alluded to. It may also occasion various associated ailments. When arising from previous disorder of the stomach or of the intestines, or of the liver itself, the primary affection will be more or less increased by it. The associated ailments, with some of which it often stands in the relation either of cause, or of effect, are chiefly, indigestion, constipation, diarrhoea, jaundice, colic, hypochondriasis, agues, rheumatism, gout, herpetic and other cutaneous affections, enlargements of the spleen, asthmatic seizures, dropsy, and palpitations or other irregular actions of the heart. I have often had occasion to observe, that, when any of these complaints was attended by the symptoms characterising this affection, if a purgative succeeded in procuring copious bilious evacuations, a very beneficial effect speedily followed. In many of these morbid associations, a very gentle aperient has produced a very violent operation, but the result has always been most salutary. A lady was subject for some time to palpitations, intermissions of the pulse, with great uneasiness at the præcordia. Various opinions were given as to the nature of the disease. Having been consulted, I observed several of the symptoms indicating accumulations of bile on the biliary passages. A moderate dose of calomel to be taken at bed-time, and a mild purgative draught in the morning, were prescribed. Violent catharsis followed; and the disordered action of the heart disappeared. In 1822, I was requested by a practitioner to see a patient with him, labouring under a severe attack of asthma. He had been purged, but without relief. I inferred from the symptoms, that accumulations in the biliary passages had favoured the accession of the seizure; and therefore prescribed, in addition to other means, five grains of calomel, with one of ipecacuanha, and five of the extract of henbane, to be given at night, and a stomachic aperient in the morning. The former of these procured an irruption of acrid bile into the duodenum to such an amount as to occasion violent cholera; the morbid bile, in passing through the rectum, occasioning severe scalding and excoriation around the anus. — A military officer, who had suffered several attacks of ague, was seized with it in London, during an easterly wind in March. The practitioner who attended him had prescribed purgatives, and the sulphate of quinine, without benefit. I recommended a bolus

to be given at bed-time, containing twenty grains of calomel, five of James's powder, and three of camphor, in conserve of roses; a purgative draught in the morning, and persistence in the use of quinine. Before the purgative draught was taken, violent bilious purging came on, and he had no return of the ague. I could adduce, if it were requisite, numerous instances illustrative of the importance of attending to the association of the morbid state now under consideration, with other ailments. I know of no disordered condition which so generally *predisposes*, or so frequently *gives occasion*, to other and more severe diseases, as this.

15. iv. The *Remote Causes* of accumulations of bile are numerous, and not fully recognised by writers. From my own observations in this climate, as well as in warm and other countries, I believe that they will be found to be the following. — (a) *Predisposing.* — A warm, moist, low, and miasmatic climate; mental depression, anxiety, and grief; general debility, and weakness of the digestive organs; the bilious, melancholic, or phlegmatic temperaments; sedentary occupations, indolence, and confinement; insolation; too full living, and the use of too much animal food; indulgence in wine or spirituous liquors; and venereal excesses. — (b) The *exciting causes* are — the sudden or protracted abstraction of the heat of the body, especially when in an inactive state, as sleeping with too few clothes, or in a damp bed, and the ingestion of cold drinks or ices; neglect of the bowels; and agues, or previous disorder of the biliary apparatus.

16. v. *Treatment.* — The means to be employed for the removal of this disorder are so evident as scarcely to require remark. Cases, however, occur, in which some discrimination, as to the choice of medicines for the evacuation of the accumulated secretion, is necessary. In general, the milder purgatives should be first prescribed; and, if these fail, the more energetic may be employed. It often happens, particularly when the bile has become inspissated, or when the gall-bladder and ducts have had their contractility much impaired by over-distension, or by any other cause, that the repeated exhibition of chologogue purgatives is necessary. But in other cases, especially when the bile has acquired acrid qualities, the gentler means will be the least likely to produce the severe effects often following the first dose of a purgative, after the disuse of this kind of medicine for some time. Accordingly, five grains of blue pill, or of PLUMMER'S pill, may be given at bed-time, and a mild aperient draught the following morning. The evacuations should be inspected, and the repetition of these, or the selection of more active means, determined upon from the appearances they will present. If it should be necessary to repeat the purgative frequently, the mercurial ought to be given with caution, or only on each second or third night, and either of Formulæ 205. 266., or of the following, should be taken on the following morning, and on the intervening nights, until all biliary collections have been removed: —

No. 230. R. Infus. Sennæ Comp., Infus. Gentianæ Comp., āā 3vj.; Potassæ Sulphatis ʒj.—3ss.; Extracti Taraxaci 3ss.—ʒij.; Tinct. Cardamom. Comp. ʒjss. M. Fiat Haustus, horâ somni vel primo mane sumendus.

No. 231. R. Infus. Calumbæ, Infus. Sennæ Comp., āā 3vjss.; Sodæ Sub-carbon. gr. xv.—ʒj.; Extr. Taraxaci ʒij.; Tinct. Cardamom. Comp. ʒjss. M. Fiat Haustus ut suprâ sumendus.

No. 232. R. Potassæ Supertart. in pulv. ʒss.—3vj.; Confect. Sennæ ʒss.; Syrup. Zingiberis q. s. ut fiat Electuarium molle, cujus dimidium sumatur horâ somni, vel mane nocteque.

17. The above are generally sufficient to accomplish the ends in view. But sometimes they fail, although repeated, to procure a sufficient evacuation of bile, or to remove all the symptoms depending upon collections in the biliary passages. When this is the case, a full dose of calomel, with James's powder or camphor, or ipecacuanha, or with the compound camboage pill, or the compound extract of colocynth, may be given at night; and either of these draughts, or a solution of neutral salts, in the morning. An emetic is often beneficial in such circumstances, before these measures are resorted to. When there appears reason to believe that the accumulation of bile arises from active congestion of the duodenum, particularly when the symptoms of inflammatory indigestion are present, or when the indications of spasm in the ducts seem to exist, calomel is generally necessary, and it may be repeated with advantage. The combination, also, of ipecacuanha or antimony, with the purgative taken at night, promotes the action on the biliary organs. In some obstinate cases, when it was necessary to repeat the purgatives frequently, I have given colchicum, in either of the above draughts, with benefit. Besides these, frictions with stimulating liniments over the right hypochondrium and epigastrium, or a blister, the nitro-muriatic acid lotion, or the emplastrum ammoniaci cum hydrargyro, in the same situation, may be prescribed. A healthy air, or change of air, regular exercise, particularly horse-exercise, early hours, and the use of the Cheltenham mineral waters, or the artificial mineral waters of Seidschutz or of Pullna, with attention to diet, will materially promote the action of the biliary apparatus.—The treatment is in other respects similar to that advised in the articles on CONSTIPATION and INDIGESTION.

III. EXCESSIVE DISTENSION OF THE GALL-BLADDER.

18. i. It is not often that the accumulation of bile in the gall-bladder is so great as to give rise to an external tumour, as its discharge into the duodenum generally occurs, before it reaches this extent. But cases sometimes are seen in which a very distinct tumour is formed by the distended gall-bladder, in one of the following situations:—1st, In the epigastric region and a little towards the right side;—2dly, Immediately below the cartilaginous margins of the right ribs;—3dly, Lower in the hypochondrium, and directed either downwards, or upwards, or even backwards, but most frequently rising into the epigastrium;—and, 4thly, Descending down either towards the umbilicus, or to the crest of the ilium, or between these situations.—The distension of this viscus arises—(a) from inflammation and tumefaction, or thickening, &c. of the coats of the common duct, occasioning more or less narrowing or complete obstruction of its canal;—(b) from similar lesions, or tumours, in the duodenum, implicating the termination of this duct;—(c) from the arrest of a biliary calculus in the same situation;—(d) from tumours in the pancreas, pylorus, or adjoining parts, or even in the liver itself, pressing upon this duct;—(e) From the entire obliteration of the duct, in consequence of either of the foregoing lesions;—and (f) possibly

from spasmodic constriction, or from the accumulation of thickened bile or mucus in the canal. Of these five alterations, all but the last have been observed by me in *post mortem* examinations. The last very probably has existed in some of the cases in which the tumours have disappeared with more or less rapidity.

19. The tumour, thus formed by an excessively distended gall-bladder, may—*α*. continue during the remaining life of the patient; *β*. or disappear after a longer or shorter time, its subsidence being either slow or rapid. This latter event may proceed either from the removal of the obstruction in the common duct, whether this have been spasm, inflammation, or any of the more mechanical obstacles just mentioned; or from the gradual absorption of more or less of the bile in the bladder. When absorption of the contents of this viscus proceeds, an additional quantity not passing into it, the tumour will disappear slowly and gradually. Instances have occurred, however, in which the coats of the gall-bladder, owing to the great distension, or to the acrimony of the contained fluid, have become inflamed, or ulcerated, and have subsequently been perforated or ruptured, the contents being effused, either into the peritoneal cavity, giving rise to intense and rapidly fatal peritonitis, or into some other viscus with which the gall-bladder had previously formed adhesions. Cases of this kind have been recorded by SCHENCK, BERTIN, ALBERTI, SALMUTH, BONNET, DESJARDIES, PORTAL, FRANK, DOUBLE, and PORRAL. The accumulated bile may even be poured out externally, owing to the adhesion of the gall-bladder to the abdominal parietes, and to the inflammation, ulceration, and perforation having proceeded from the former to the surface of the latter. HORSTIUS, BLOCH, AMYAND, and DE HAEN have detailed cases of this description.

20. Although calculi lodged in the common duct most frequently occasion distension of the gall-bladder, yet this cause may exist without this effect being observed; or it may have been present and have gradually subsided. M. DUPLAY (*Journ. Hebdomad.* t. iii. p. 14.) has adduced a case, in which this duct was completely obstructed by a calculus, the hepatic ducts and their radicles having been much dilated, and yet the gall-bladder was atrophied, and reduced to a simple canal with thickened parietes. Inflammation of the gall-bladder had most probably supervened in this instance, and been followed by thickening and constriction of its coats, with absorption of its contents. M. PETIT thinks that inflammatory engorgement and tumefaction of the liver is often concerned in producing accumulation of bile in the bladder; and that, when the resolution of the inflammation is followed by a copious secretion of this fluid, before the congestion or tumefaction and obstruction of the common duct have been removed, the distension of the gall-bladder will often be excessive. From whatever cause it may arise, the accumulation is often remarkable. In a case related by Mr. GIBSON (*Edin. Med. Essays*, vol. ii. p. 352.), the tumour was so large as to reach over to the left hypochondrium, to force out the false ribs of both sides, and to occasion great difficulty of breathing. The common duct was found after death obstructed by concretions, and the gall-bladder contained eight pounds of thick bile.—YOUNG (*Philos. Trans.* vol. xxvii.)

found, in the body of a middle-aged female, a similar obstruction, and nearly the same quantity of thick bile in the gall-bladder. Parallel instances, to which references are made at the end of this article, are recorded by VESALIUS, GOLDWIZ, HEUSINGER, HAUTESIERK, AMYAND, VETTER, KRAEFF, VAN SWIETEN, DUVERNEY, PEZOLD, WIEDEMANN, and others.

21. The contents of a distended gall-bladder do not always consist of bile. In rare instances, purulent matter, or numerous biliary concretions, have been collected in it. — The former has generally passed into it from an abscess in the liver, either along the ducts, or subsequent to adhesions formed between the external surfaces of the liver and gall-bladder. — MORGAGNI and FANTONI found it distended by air.

22. ii. *Diagnosis*. — A tumour arising from accumulations of bile in the gall-bladder may be mistaken for an *abscess of the liver*, or for *encysted dropsy*, or for a *tumour containing hydatids*; and, if an opening were made into it, in the supposition of it being either of these, a fatal result would immediately ensue, unless adhesions had previously formed between the gall-bladder and the parietes of the abdomen, which rarely take place. It, therefore, is very necessary to distinguish between these diseases and an excessive distension of the gall-bladder. — (a) The diagnosis between this latter and *abscess of the liver*, pointing externally, is often difficult. In a case which I had an opportunity of seeing, the surgeon was about to puncture the tumour; when delay having been suggested, and chologogue purgatives prescribed, the tumour disappeared after a copious discharge of bile. A similar case was lately reported in one of the London Medical Journals. M. PETIT, having been consulted in a case that had been considered abscess of the liver, had commenced with the operation for the removal of its contents; but as soon as he had divided the integuments the tumour became soft, and instantly afterwards subsided. He closed the incision and proceeded no further, telling the assistants that this occurrence had shown him the nature of the disease, and that copious bilious evacuations would soon take place. This directly occurred, and the patient recovered. — The symptoms distinguishing between these two lesions are the following: — 1. The rapid appearance and circumscribed form of the tumour, with manifest fluctuation throughout its extent, when it proceeds from the gall-bladder. — 2. The softness and mobility of the integuments over the more prominent parts of the tumour; and the absence of a diffused swelling or hardness at the circumference, and of œdema, or of an emphysematous feel, when it is thus produced. — 3. Abscess of the liver is consequent upon inflammatory symptoms referrible to this viscus. The tumour it occasions forms slowly; is attended with great swelling, and tension in the parts adjoining; and is at first diffused, hard, and imperfectly defined. Fluctuation is very obscure, occurs late in the progress of the swelling, and is confined to the centre, the circumference being hard and tumid. — 4. There are always febrile symptoms attendant upon this disease; but they are seldom observed in distension of the gall-bladder, unless inflammation has supervened. — 5. Pain in suppuration is pulsatory, in the other it is not; and it generally intermits. — 6.

Shivering is more frequently present in suppuration, or continues longer, than in distension of the gall-bladder; and it terminates in perspiration, which rarely occurs in the latter. — 7. A distended gall-bladder presents more of the appearance of a deep-seated encysted tumour than of abscess. — (b) The swelling from *encysted dropsy* is larger, and the fluctuation more distinct, than from a distended gall-bladder. — (c) The same remark, however, does not apply to the *encysted tumours* that contain hydatids. Between both these and distension of the gall-bladder, the diagnosis is often very difficult, unless the appearances of the evacuations, and of the skin, are closely observed. In the latter, the stools are devoid of bile — are white or clayey, &c.; the urine is very dark, loaded, and clouded; and the skin discoloured or jaundiced. In the former, the stools are rarely without bile, and the other symptoms are seldom observed; as there is no interruption of the passage of this secretion into the duodenum, nor suppression of the function.

23. iii. The *Treatment* of excessive distension of the gall-bladder should not be materially different from that advised for the common occurrence of impaired action of the biliary passages (§ 16.). The alkaline subcarbonates, the spirits of nitric ether, and the extract of taraxacum, in liberal doses, either in camphor julap, or in the medicines prescribed above (§ 16.), or in the decoction of taraxacum, will often be serviceable; especially when the use of them is steadily persisted in, is varied according to circumstances, and is aided by the external remedies already mentioned (§ 17.). When the distension seems to arise from the arrest of biliary concretions in the common duct, or, indeed, from any other cause, the liquor potassæ, Castile soap, the subborate of soda, antimonials in small doses, anodynes, the warm bath, and oleaginous aperients, as olive oil, &c. will be the most useful. — *Emetics* are dangerous; but laxatives, mild purgatives, and aperient enemata are beneficial, and should be continued from time to time. In all cases of biliary obstruction, the means enumerated at another place (see art. CONCRETIONS. — *Biliary*, § 14. *et seq.*) will be also very appropriate. — The most suitable *beverages* are the common imperial drink, or a solution of equal parts of the super-tartrate of potash and subborate of soda, dissolved in a weak decoction of marsh-mallows, or of taraxacum, with a little orange-peel, &c.; or warm whey, or soda water, or spruce beer. The factitious waters of Seidschutz, or of Geilnau, or of Marienbad, or the mineral waters of Seidlitz, of Leamington, or of Scarborough, are often of service both in this and other forms of biliary obstruction. But I believe that there is no mineral water more beneficial than that most common of all mineral waters, namely, sea water, when it is taken in sufficient quantity, and persisted in for a reasonable period.

IV. INFLAMMATION OF THE GALL BLADDER AND DUCTS. *Hepatitis Cystica*, Sauvages; *Cholecystitis*, Hildenbrand.

CLASSIF. — II. CLASS, III. ORDER (*Author*).

24. DEFIN. — *Deep-seated acute pain in the epigastric region, extending to the right hypochondrium, and backwards, generally with vomiting of a greenish bile, frequently with jaundice, and always with symptomatic fever.*

25. i. The *Symptoms* of inflammation of the gall bladder or ducts are extremely fallacious. This disease may be either acute, sub-acute, or chronic; and, in either of these states, it is generally consecutive of inflammation of the concave surface of the liver, or of obstructions of the ducts, or of the irritation of biliary concretions; and hence its approach is slow and insidious, or the symptoms attending it are merely an aggravation of those produced by the antecedent disorder. This is especially the case when it occurs in a chronic or sub-acute form. Chills or rigors may or may not occur; but they are generally preceded by pain, more or less severe and acute, in the situation mentioned above. Vomiting is frequently present, and the matters ejected are often greenish. There is great tenderness at the epigastrium; and pressure is apt to excite vomiting. Severe colicky pains are felt in the upper regions of the abdomen; and jaundice sometimes appears suddenly. The attendant fever is characterised by a small or constricted pulse; by evening exacerbations; by a very dark, turbid, and scanty urine, and by thirst. The stools are generally devoid of bile. These are the most constant symptoms of inflammation of this viscus; but they are not altogether to be depended upon; for they are usually present in hepatitis, and even in duodenitis or gastritis. — Another circumstance, which adds to the difficulty of diagnosis, besides its mode of accession, is its frequent *complication* with these diseases, or with dropsical effusion, especially in the abdominal cavity. But inflammation of the gall bladder or ducts is often consequent upon excessive distension; and, when this is the case, the characteristic symptoms commonly follow a more or less distinct tumour in some one of the situations I have noticed above; and the nature of the complaint is thereby made manifest; jaundice and white stools, with very dark urine, being then seldom or never wanting.

26. ii. *Changes consecutive of Inflammation of the Gall-bladder, &c.* — These are various. I shall take a brief view of the most common. — (a) *Suppuration, ulceration, and softening*, are not infrequent. The gall-bladder may be almost filled with *pus* from inflammation of its internal surface; but the admixture of pus with the bile, and ulceration, are more common. Cases of this kind have been noticed by VETTER, MORGAGNI, AMYAND, WALTER, MORAND, FRANK, BAILLIE, SOEEMMERRING, MARTIN SOLON, and ANDRAL. The ulceration may pass into *perforation*, or even *rupture*, without any very considerable distension of the viscus having previously occurred; the bile being effused in the peritoneal cavity, or into some adjoining viscus, in the manner already noticed (§ 19.). In cases of ulceration and rupture, *softening* is not often absent; and probably it favours the latter occurrence. — (b) *Gangrene* is a very rare occurrence. I have seen it mentioned only by J. P. FRANK. — (c) When inflammation either commences in, or extends to, the more external coats of the gall-bladder, *adhesions* of it take place to adjoining parts. It has been seen adhering to the peritoneum, by BLOCH, PETIT, &c. — to the omentum, by WALTER — to the duodenum, by LUDWIG, FRANK, PORRAL, REYNAUD, myself, and others — to the colon, by WALTER, &c. — and to the liver, by ANNESLEY, myself, and several writers. These adhesions

may exist either with or without distension, or the presence of biliary concretions; but either, or both, are often observed, or have manifestly existed at one period or other of the disease. — (d) *Thickening* of the coats of the viscus is evidently a consequence of inflammation in some one of its grades. It has been remarked by SCHMALZ, WALTER, J. P. FRANK, SOEEMMERRING, ANDRAL, and myself. STOLL and LEVEILLIE have noticed the thickening, conjoined with a *cartilaginous induration*. — (e) *Ossific deposits* in its coats have been found by RHODIUS, WALTER, MURRAY, GRANDCHAMP, MOLLINELLI, BAILLIE, and ANDRAL.

27. There are *various other alterations* of the gall-bladder which do not necessarily arise from any grade or mode of inflammation, and which may be noticed at this place. — *α.* The gall-bladder may be *hypertrophied* in respect both of its capacity and the thickness of its coats. The simple distension arising from obstruction of the common duct cannot be justly called hypertrophy, although some French pathologists have thus denominated it. — *β.* *Atrophy*, or wasting, of it is not uncommon, even as a consequence of chronic inflammation affecting either itself or the ducts, particularly the cystic duct. Instances of this change are recorded by MORGAGNI, WALTER, ROSSI, SOEEMMERRING, HUFELAND and ANDRAL. In these cases, the passage of bile into or from it having been prevented, the portion of this fluid contained by it has been absorbed, and the functions of the viscus having ceased, its structure has gradually wasted, until it has almost disappeared. — *γ.* Instances, in which the gall-bladder has been either congenitally *wanting*, or has *disappeared* from antecedent disease, have been adduced by FERNELIUS, MARCELLUS DONATUS, SCHENCK, HUBER, MORGAGNI, JAEGER, LUDWIG, SANDIFORT, ZEIGLER, BALDINGER, LEMERY, BOULET, TARGIONI, TOZZETTI, LITRE, WIEDEMANN, OTTO, DENDY, &c. — That this viscus may entirely disappear, in the same manner as it becomes atrophied, may be admitted. When only atrophy has occurred, there is still some little cavity left; but when the bladder has disappeared, the cystic duct is reduced to a fibrous chord terminating in a mass of cellular tissue. — *ε.* The coats of the gall-bladder may, moreover, be infiltrated with serum, or contain *tuberculous, or calcareous matters*.

28. iii. The *Ducts* — the *hepatic, cystic, and common* — are liable to all the changes noticed with reference to the gall-bladder — to distension, obstruction, inflammation, thickening, ulceration, softening, perforation, rupture, hypertrophy, atrophy, obliteration, &c. — The *symptoms* however, attending these lesions during life are very equivocal. The symptoms, proceeding from inflammation closely resemble those enumerated as indicating inflammation of the gall-bladder. Most of the changes, to which the ducts are obnoxious, are the effects either of concretions obstructing and irritating them, or of inflammation having extended to, or been excited in, them. Inflammation, whether it extends to them from the duodenum, or from any other part, or arises from the acrimony of the secretion passing along them, is equally accompanied by swelling of their coats, and by more or less complete obstruction of their canals, often with softening or ulceration. — *Constriction or narrowing* from this cause has

been observed by BONET, HOFFMANN, MEAD, BIANCHI, BRÜNING, CRICHTON, BAILLIE, ANDRAL, &c.; and complete *obliteration* of one or other of them has been remarked by myself and most of the writers referred to in this article.—*Ossification* of them has been seen by BONET and SOEMMERING.—*Dilatation*, principally of the common and hepatic ducts, is recorded by SCHENCK, DUVERNEY, MORGAGNI, WALTER, RICHTER, DUPLAY, ANDRAL, and TODD.—*Rupture* of these ducts has occurred to WOLFF, ANDRAL, and others. References to all the foregoing lesions will be found at the end of the article.

29. iv. *Spasm of the Bile-ducts*.—The existence of this disorder has been presumed rather than proved. Without denying, however, its occurrence, particularly when acid bile, or gall-stones, are passing along the ducts, I believe that it seldom takes place unless from these causes, and in connection with inflammatory irritation.—The instances of sudden appearance of jaundice sometimes met with have been imputed to spasm of the ducts; but, although spasm may occur independently either of inflammation, or of biliary concretions, yet the pathological state producing jaundice is most frequently seated in the liver itself. The affection, therefore, which has been generally ascribed to spasm of these canals should be rather imputed to either of the above causes, or to any two of them — 1st, to inflammatory irritation without calculi; 2dly, to the irritation produced by calculi; 3dly, to irritation caused by acid bile; 4thly, to spasm chiefly; and 5thly, to either of the foregoing in connection with spasm.—It is hence most difficult to distinguish spasm from inflammation of the ducts, or either of these from the passage of gall-stones. Indeed, the symptoms indicating the latter are in no respect different from those attending upon most of the cases generally imputed to spasm.—A sudden, sharp, deep-seated, and severe pain at the pit of the stomach, darting back to the right side of the spine, or to the lower angle of the right shoulder-blade, and to the hypochondrium, occurring in paroxysms, and often followed by rigors, coldness of the extremities, &c., are felt in both. Nausea and vomiting are sometimes also present. When, however, the disorder proceeds chiefly from spasm, pressure gives relief of the pain in the epigastrium, as well as of the colicky pains usually felt at intervals in the abdomen.—The patient commonly turns upon his belly, or lies partly on the right side, and partly on the abdomen. This, in connection with the slight affection of the pulse, chiefly distinguishes spasm, from inflammation, of the ducts. In other respects the symptoms are nearly the same as those stated to indicate the passage of the gall-stones.—(See art. CONCRETIONS — *Biliary*, § 8.)

30. v. TREATMENT. — *Inflammation of the gall-bladder and ducts* should be treated in a nearly similar manner to other inflammations, but with reference to the organisation and functions of the part. The *first intention* should be, to remove the inflammation; the *second*, to procure a free and healthy flow of bile into the duodenum. *Bloodletting*, both general and local, is always requisite; and generally tends to the fulfilment of both indications. Immediately after the first bloodletting, a full dose of *calomel* — from five to

twenty grains — according to the age and strength of the patient, with *James's powder* and *opium* or *hyoscyamus*, may be given, with few exceptions. Experience has proved the propriety of exhibiting one or two doses of this medicine, in cases where these parts have been either partially or chiefly implicated, and the experiments of Mr. ANNESLEY have demonstrated the influence of a large dose of calomel in diminishing inflammatory irritation of the stomach and duodenum, — an effect which, if produced in these viscera, will probably extend to the gall-ducts. If a repetition of the bleeding should be necessary, the calomel, antimony, and opium may be repeated immediately afterwards, as this combination has a most decided effect, when thus exhibited, in diminishing vascular action, and in equalising the circulation. Mild *aperients* and *cathartic enemata* may subsequently be given; and, having thereby procured evacuations, medicine of a *deobstruent* and *relaxant kind* should be prescribed. The *alkaline subcarbonates* with *taraxacum*; the *subborate of soda*, in the *decoctum althææ*, with small doses of *ipécacuanha*, and of the powder or the extract of the leaves of *belladonna*, and the *nitrate of potash* or *muriate of ammonia*, in camphor mixture, with large doses of the *spirits of nitric ether*; are the most appropriate medicines; but they should be given in repeated doses, and so as not to offend the stomach.

31. Of the *external applications*, the most efficacious are the warm *terebinthinated embrocation*, *warm poultices*, *fomentations*, and afterwards a plaster, consisting either of the *emplastrum ammoniaci cum hydragyro*, or chiefly of the extract of *belladonna* and *camphor*, according to the peculiarities of the case.—Having removed inflammation, and relieved the more urgent symptoms, by these or similar means, a due flow of bile into the duodenum should be promoted by small doses of blue pill, or of PLUMMER'S pill, the liquor potassæ, or the subcarbonates of soda or potash, or the subborate of soda, or the acetate of potash, or the extracts or decoction of taraxacum or of chelidonium, or the ethers, &c. variously combined. A gentle action on the bowels, by emollient and oleaginous medicines, should be continued for some time. If pain of a spasmodic kind recur, *belladonna*, or *hyoscyamus*, or *opium*, or *colchicum*, may be given with these; and if the irritation seem to be owing to the presence of gall-stones, the combination of the spirits of turpentine, with sulphuric ether as advised by DURANDE, STRAUB, WITTING, QUARIN, and others, or with alcohol, as recommended by PERCIVAL, or with the spirits of nitric æther as directed by WOLF, may be tried. An anodyne may also be given with either of these combinations, especially *hyoscyamus*, or *belladonna*.—*Colchicum*, with the alkaline subcarbonates, has proved of great benefit in some cases in which I believed the biliary passages to have been implicated in the inflammation of the associated viscera; and *prussic acid*, given in full doses with olive oil, or with almond oil and camphor julap, has afforded great relief where there was every reason to suppose that gall-stones or spasm was the cause of suffering.—The treatment in other respects, as well as the diet and regimen of the patient, are altogether the same as are fully detailed in the articles CONCRETIONS — *Biliary*, and JAUNDICE.

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GANGRENE.—SYN. *Gangræna*; *Sphacelus*; *Mortification*. — Γάγγραινα (from γράω, I eat or devour). *Gangrène*; Fr. *Der Brand*, Germ. *Cangrena*, Ital.:

CLASSIF.—IV. CLASS, IV. ORDER (*Author*, in *Preface*).

1. DEFIN.—*Death of a part or the whole of an organ.*

2. The terms *gangrene*, *sphacelus*, and *mortification* are usually applied to the same condition, especially by Continental writers. Dr. CARSWELL has pointed out certain distinctions between them, restricting the first appellation to incipient mortification, and the second to the last stage of this lesion. He has thus made *Mortification* to be the generic term. This is in accordance with the meaning usually attached to the terms in this country; but, as mortification is the last result of the morbid state—is no longer a disease, but its termination—I have preferred the first of these appellations; and especially as it is the most appropriate to the changes generally comprised under these terms, and as it is usually applied to a lesion which, in respect of its nature and treatment, comes much more within the province of the medical practitioner, than that which the terms *sphacelus* and *mortification* are generally employed to represent. — Formerly, *gangrene*, particularly in its medical relations, was considered merely as a consequence of inflammation; but a more extended view of it has been taken by some Continental writers: and, still more recently, it has been treated by Dr. CARSWELL in an able and comprehensive manner. The *division* of this subject must necessarily have an intimate relation to the principal causes which produce it. In considering, therefore, the *pathological relations of gangrene*, I shall view it successively—1st, As a consequence of inflammation; 2dly, As a result of local or general debility or exhaustion interesting chiefly the organic nervous influence; 3dly, As an effect of obstructed circulation; 4thly, As produced by various physical agents; and 5thly, As occasioned by poisonous substances.

3. I.—PATHOLOGICAL RELATIONS OF GANGRENE.—i. GANGRENE CONSEQUENT UPON INFLAMMATION.—All parts susceptible of inflammation may become gangrenous in consequence of it; but there are various circumstances that cause this change to be more common in some tissues or parts, than in others. The *vascularity* of a part disposes it to inflammation, and consequently to gangrene. Hence, cellular and mucous tissues are much more liable to it, than fibrous and serous structures. The latter never experiences it until the cellular tissues by which they are nourished have undergone a similar change.—The *sensibility*, *excitability*, and *susceptibility* of a part have also a great influence in producing it; the disposition to inflammation, and to gangrene as one of its results, being in proportion to the grades of these properties with which an

organ or structure is endowed. — The *situation of a part or structure* at a distance from the centre of vital or nervous influence, and of circulation, has also some influence in favouring the termination of inflammation in gangrene. Also, intense grades of inflammation in these parts may proceed until this result takes place, without causing death; whereas inflammations of the more vital and central organs, as the heart, brain, &c., put an end to life before this change has supervened.

4. *Various pathological states* dispose not only to inflammation, but also to the supervention of gangrene. The most important [of these are — *a.* Disorder of the digestive organs, especially impaired energy of the organs most directly influenced by the organic nervous system; — *b.* A weak and irritable state of constitution; — *c.* Exhaustion by previous disease, particularly by fevers and epidemic maladies; — *d.* Interruptions of the excreting functions, and of the depurative action resulting therefrom; — Morbid conditions of the blood, as in typhoid, malignant, and exanthematous fevers, in erysipelas, and in scurvy; — *f.* Pre-existent functional or structural changes in a part, as impeded circulation, congestion, &c.; — *g.* Interrupted circulation in an adjoining organ, or obstructed return of the venous blood from the part affected. These conditions not merely predispose to inflammation, but also modify its characters, and favour most remarkably the occurrence of gangrene, especially when more than one of them are in operation; as in erysipelas, in which we generally observe the inflammatory action supervene on marked disorder of the digestive and excreting functions, on a morbid state of the circulating fluids, and on disordered circulation in the part.

5. The *Causes* which induce inflammation also influence its termination in gangrene, but to a much less extent than the influences already noticed, unless they be of a disorganising or poisonous kind, when they more properly fall under a different head. *Intensity of the exciting causes*, relatively to the excitability and susceptibility of the part, have some influence, especially when it is great; the consequent vascular reaction, in connection with the morbid impression made by the cause upon the vital properties of the part, often rendering inflammation more acute and severe, and thereby more prone to exhaust vital power, or to pass into gangrenous disorganisation. But agents which excite inflammation, without producing a mechanical, chemical, or poisonous operation, do not very remarkably favour the occurrence of gangrene, independently of this circumstance, and of those already enumerated. The disposition to terminate in gangrene will doubtless be increased by the *intensity of the local and general vascular action* relatively to the state of constitutional power; but such intensity of action will itself, in a great measure, result from the circumstances already enumerated. In a word, therefore, the causes of inflammation passing into gangrene, are those stated above, in connection, with peculiarity of temperament, constitution and habit of body, and with the intensity of local and general vascular action, relatively to vital resistance or power, characterising the inflammatory state.

6. *A. Of the Phenomena of Gangrene from Inflammation.* — *a.* *In respect of particular Tissues and Organs.* — *a.* *Of the integuments.* —

When inflammation is about to pass into gangrene, very evident changes take place in the *colour, temperature, sensibility*, and *vital cohesion* of the part. The redness becomes darker, or changes to a livid, violet, purplish, or black hue. The morbidly increased temperature and the augmented sensibility of the inflamed part are remarkably lessened; and the pain has disappeared from it, and extended to the surrounding structures. The vital cohesion of the part is much weakened, although its density is sometimes augmented. — Vesicles also appear on the surface, owing to the effusion of serum, or of a sanguinolent serum, under the cuticle. — These changes become more manifest as the gangrene passes into its second stage, or sphacelus. The colour becomes grey, yellowish grey, greenish, brown, or black, or various intermediate shades. The vesicles are now enlarged, or the cuticle is entirely separated by the effusion of a bloody serum beneath it, which escapes and leaves the skin loosely covered by it, or partially denuded and discoloured. The integument crepitates on pressure, is puffy, soft, cold, and insensible. It soon afterwards emits a cadaverous and offensive odour, indicating that the gangrened part is quite dead, and is undergoing decomposition.

7. The emphysema and fœtor of the part are proofs of the gangrene having arrived at complete mortification and putrefaction; but the part may be completely dead without these phenomena being observed. Among the chief changes that occur after gangrene has taken place, are the *spreading and limitation* of it. The former is increased by whatever depresses the organic nervous power or contaminates the blood; and, as long as it continues, the dark red or livid discolouration attending it extends further and further, and gradually disappears in the surrounding sound skin. The latter change is promoted by whatever restores nervous energy, increases vital resistance, and promotes the assimilating and excreting functions. As soon as it commences, the livid or dark red discolouration of the circumference or margin of the gangrened part is more narrowed. Ulceration commences at the margin of the inflamed part, and separates from it, in the form of slough, the portion which had become gangrenous. The loss which is thus occasioned, is partially repaired by the exudation of coagulable lymph, which, becoming organised in the form of granulations, assume more and more of a membranous form, and constitute, in its complete state of reparation, the cicatrix. — A favourable change in the part and in the constitutional affection may occur at an early period of gangrene, and the result may be still more felicitous. In this case, the dark red or livid colour of the affected part becomes more circumscribed, and assumes a brighter tint: the swelling subsides, and the temperature gradually returns; all the functions, as well as the organisation, are preserved. — Gangrene of the skin always implicates to a greater or less extent the subjacent cellular tissue; but this latter may be the primary and chief seat of this change.

8. *β. Gangrene of the cellular tissue.* — This tissue is more frequently, more extensively, and more rapidly affected by gangrene than any other part, more particularly where it is most abundant or is covered by aponeurotic expansions, which prevent contaminating fluids from reaching the

surface.—Gangrene of this tissue is either *diffused* or *circumscribed*. In the *diffused form*, it generally occurs in external parts, and most commonly follows erysipelas, and diffused inflammation of the cellular tissue from abrasions, wounds, punctures, and the inoculation of morbid or putrid matter, as by wounds in dissection. In these cases the inflammation spreads rapidly and extensively, terminates quickly in gangrene, and often extends to the blood-vessels, tendons, aponeuroses, and lymphatics. These resist, for a longer time, the disorganising process; and are often seen, especially in the extremities, running in the midst of decomposed cellular tissue, and of effused fluids. If the inflammation affect the interior of a considerable venous or arterial trunk, particularly that which chiefly supplies a limb, the circulation through it is interrupted by the lymph effused in its canal, and the entire part beyond the seat of obstruction is struck by gangrene. In the internal viscera, gangrene very seldom occurs in a diffused form, unless in cases where erysipelas extends to the fauces and parynx, or in the more malignant cases of angina.

9. *Circumscribed gangrene* of the cellular tissue is seen in that connected with the integuments, in the common boil, and in carbuncle. When gangrene is observed in the cellular tissue of internal organs, it almost always is circumscribed. When the *submucous tissue* is its seat, it generally is in spots or patches of various dimensions, and is consecutive of inflammation which has commenced in the mucous membrane, and extended thence to the submucous tissue. In such cases, particularly in dysentery, considerable portions of the mucous surface are detached, owing to gangrene of its subjacent tissue.—Although gangrene of the *subserous cellular tissue* is more or less circumscribed, yet it is often extensive; but, in these latter instances, the serous membrane is also implicated. This is especially the case when the sub-peritoneal tissue is the seat of lesion. It is rarely, however, that the inflammation of it, which terminates in this manner, commences in the peritoneum, unless in some cases of strangulation from hernia or intussusception. It commonly either originates in the cellular tissue itself, or extends to it from adjoining parts. Indeed, this is always the case in respect of the subperitoneal tissue of the lumbar, iliac, and pelvic regions.

10. *γ. Mucous membranes* are sometimes found gangrenous; but not so frequently as was supposed by the older writers, who mistook softening, discolouration from the imbibition of morbid secretions, and even albuminous exudations thrown out on their surfaces, in the form of false membranes, for sphacelation.—Gangrene of this membrane is generally circumscribed, often very limited, and seated chiefly in the throat, the lower part of the ilium, in the cæcum, the sigmoid flexure of the colon, and in the rectum. The inflammation producing it commences, and is chiefly seated, in the mucous tissue itself, or in the follicles, or in both. The gangrene may be limited to either of these, or may extend to both, and even to the subjacent cellular tissue. Where thus changed, the mucous membrane at first presents an ash grey or greyish yellow colour, which often changes to brown or black; but the gangrened part may be tinged by the secretions

or other substances applied to it, especially by the bile, or by the blood.—The part surrounding the slough is generally congested, of a brownish red, or of a purple, or livid hue. Dr. CARSWELL remarks that, when the inflammation has been confined to the agminated, or PEYER's, follicles, and when the greater part, or the whole, of the follicle has sloughed, little congestion or inflammatory redness may remain. If these glands are already the seat of disease—as in continued and hectic fevers, consumption, &c.—a slight attack of inflammation may destroy their vitality, and little or no vascularity may be observed around them after death. The mucous surface of the *bronchi* is rarely the seat of gangrene, and only consecutively of inflammation of adjoining parts.—Gangrene of the mucous surface of the *uterus* and *vagina* is not infrequently seen in dissections after puerperal fevers. (See PUERPERAL DISEASES, and UTERUS.)

11. *δ. Serous membranes* are the seats of gangrene, only consecutively of this, or of some other cause, as suppuration, ulceration, &c. in the subserous tissue, as noticed above (§ 9.). When ulceration of any part of the digestive canal extends to the peritoneal surface, this membrane, having lost the supply of blood from the subjacent tissue, sometimes experiences sloughing at the bottom of the ulcer, and consequent perforation. But this is observed chiefly when the ulcer is large, and the patient's habit of body cachectic; and most frequently in the lower part of the ilium.—The *pleura* is more rarely the seat of gangrene than the peritoneum; and the costal pleura is still more rarely affected than the pulmonary pleura. Gangrene of the latter is met with as a result of the softening of tubercles situated immediately underneath the pleura, or of gangrene of a subjacent portion of the lungs.—The serous membranes of the brain are gangrenous only as a consequence of severe injury; particularly when the membranes are exposed, and when the part is affected by erysipelas or hospital gangrene. This latter cause of gangrene of the cerebral serous membranes has been noticed by Mr. COPLAND HUTCHISON. When the serous membrane is sphacelated, it assumes an ash grey or slate colour; but it may be variously tinged by bile, blood, or morbid matters. It is also soft and spongy, and is readily detached from the surrounding tissues, which are usually more or less injected.

12. *ε. Fibrous tissues* become gangrenous only in consequence of this lesion in the immediately adjoining parts.—The *muscular tissue* is very rarely seized by gangrene after inflammation. The muscular tunics of the digestive canal are sometimes, however, thus affected, owing to the extension of gangrene from the associated tissues, as in the case of sloughing ulcers commencing in the internal coats of the tube. If recovery take place after a portion of the muscular tunic has been thus destroyed, the cicatrix which is formed contracts, as Dr. CARSWELL has stated, and the diameter of the canal is permanently lessened.—The *heart* is, perhaps, never even partially gangrenous whilst life continues; and the *arteries* and *veins* are never the seat of this change until the surrounding cellular tissue, and cellular coats of these vessels, are destroyed by it. Gangrene of the *brain*, of the *lungs*, of the *liver*, of the *spleen*, of the *kidneys*, of the *uterus*, &c. is

noticed in the articles devoted to the pathology of these organs.

13. *b.* The changes which take place in the capillary circulation, when the inflamed part is about to pass into gangrene, have been observed by several pathologists, but by none with so much care and precision as by KALTENBRUNNER (*Exper. circa Statum Sang. et Ves. in Inflam.* 4to. Mon. 1826, p. 82.) and GENDRIN (*Hist. Anat. des Inflam.* t. i. p. 31. *et passim*). According to their researches, and my own observations, the capillaries lose their tonicity and vital cohesion, become distended or even ruptured, or allow the exudation of a portion of their contents. At the same time, the blood in the distended capillaries ceases to circulate; changes from a dark red, to a dark brown or black hue; and coagulates; its globules uniting, adhering to the internal surface of the vessels, and filling their canals. A similar change takes place in whatever blood may have been effused into the areolæ of the tissues during the acme of the inflammatory state, or the passage of it into gangrene. This alteration of the blood and of the capillaries causes the livid, purple, or black hue of the affected part; and the loss of vital cohesion, and exudation of the serum, occasionally with some of the dark colouring matter of the decomposed blood, produce the soft pulpy state attending the passage of gangrene into sphacelus. With the cessation of circulation, the sensibility is quickly lost; and when the part is deprived of its vitality, incision of it neither excites sensation, nor causes loss of blood. Absorption, also, entirely ceases in the gangrened part; but proceeds with activity at the margins of the living and sphacelated tissues, as shown by the local and constitutional phenomena, and by the separation between the living and dead parts, which is partly occasioned by this process.

14. *B. Terminations, &c.* — The changes that take place in the margin of the living inflamed part are important, as upon these depends the occurrence of one or other of the following phenomena. — 1st. The limitation of the gangrene, and separation of the diseased part; — 2d. The spreading of the gangrene, and the contamination of the circulating fluids; — 3d. Dangerous or fatal hæmorrhage; — and, 4th. Ulceration. — (*a*) The entire separation of the gangrened part, in a state of sphacelus, is caused by the production of coagulable lymph in the inflamed parts surrounding the gangrene. This lymph prevents the decomposed fluids from contaminating the surrounding tissues, by agglutinating not only the areolæ of these tissues, but also the orifices or canals of the minute vessels. It also promotes the coagulation of the blood in the larger vessels, and thereby prevents the occurrence of hæmorrhage. It lastly, as the separation is perfected, becomes organised, in the tissues which it agglutinates, or in which it is effused, and is essential to the healing of the part. — (*b*) The spreading of the gangrene arises from the local and constitutional vascular action being so weak, or asthenic, or otherwise so morbid, as to be incapable of forming coagulable lymph, whereby the contaminating influence of the decomposed fluids and sphacelated tissues upon the surrounding parts may be resisted, the minute vessels agglutinated, their fluids coagulated, and absorption prevented.

When this result is observed, the vital power of the part, or of the constitution, is in fault; and either a cachectic habit of body, or a morbid state of the blood, has preceded the occurrence of gangrene, as in erysipelas, scurvy, fever, &c. — (*c*) Hæmorrhage may attend either of the preceding states of sphacelation. In the former, it arises from an imperfect coagulation of the blood in the large vessels, at the margin of the living inflamed part; the lymph not being sufficient to obstruct its extremity, or to coagulate the blood in it with the requisite firmness. In the latter, the hæmorrhage is much more frequent, as these circumstances obtain much more generally, and to a greater extent in it, than in the former. — (*d*) Ulceration may follow either internal or external gangrene. In these cases, organisation of the coagulable lymph that is formed, or granulation, does not take place; but absorption of it with the tissue in which it is deposited proceeds gradually. It is owing to this, that perforation of hollow organs follows sphacelus. When the mortified part is retained, owing to its situation, or is not thrown off, it becomes macerated, or reduced to shreds, by the fluids poured out by the surrounding vessels. A partial absorption may occur in these cases, and, by contaminating the circulating fluids, terminate life in a short time, or place it in imminent danger. — In some instances, as intussusceptions, adhesions of the opposed margins of the living inflamed parts may take place, with perfect union, the sphacelated portion being evacuated. A dead part of the lung may also be thrown off by the bronchi.

15. When gangrene, in its earlier stage, is arrested, and terminates in restoration of the healthy state, the blood begins to move in the obstructed capillaries, and the circulation, especially at the circumference, becomes more and more active. The globules of the coagulated blood seem to separate, and to pass into the currents of the minute canals; sensibility gradually returns; and the colour of the part becomes less dark or livid. The temperature also rises; and the absorption of the effused fluid commences. At last, the size and firmness of the part, with all its functions, are restored.

16. *ii. GANGRENE FROM LOCAL OR GENERAL DEBILITY — from Exhaustion of Organic Nervous Power.* — Depression of the organic nervous or vital influence is the chief pathological element or precursor of this form of gangrene, which, owing to this circumstance, is contingent on certain adynamic diseases, as typhoid fevers, scurvy, noma or gangrenous thrush, and other maladies attended by extreme asthenia. This variety is often preceded by increased sensibility, heat, and injection of the part. The last of these characteristics is the most common; and is frequently caused by pressure, as observed in the parts on which patients rest in bed, by friction, puncture, and the irritation of morbid secretions. The application of leeches, blisters, or the tartarised antimonial ointment to debilitated or cachectic children often produces it. But it occasionally appears, and proceeds rapidly, without any very manifest antecedent, or attendant, inflammatory action — certainly without increased action of a sthenic kind — particularly in very unhealthy children, and in persons affected by scurvy, or the low putro-adynamic states of fever. In these,

very slight causes will occasion engorgement of portions of the integuments, or of internal viscera, followed by the changes already described as constituting gangrene and sphacelus; and local congestions will sometimes occur and be followed by loss of vitality, without any obvious cause, or any obstruction to the circulation, or manifest increase of vascular action in the part; whatever action may appear being of an irritable, asthenic, or extremely weak kind. The gangrenous or asthenic form of *furunculi*, and the humid or phagedenic sores met with in the mouth, gums, cheeks, genitals, &c., of unhealthy children, are illustrations of this variety — the chief characteristics of which are, depressed organic nervous or vital power; imperfect or asthenic vascular action, both previous to, and attendant upon, the gangrenous lesion; and a poor or vitiated state of the circulating fluids. (See SCURVY; and THRUSH — *Gangrenous*.)

17. iii. GANGRENE FROM OBSTRUCTED CIRCULATION. — The *arteries* may be incapable of conveying blood to, and the *veins* of returning it from, a part. In the preceding varieties of gangrene, the organic nerves and capillaries are the primary and chief seats of the lesion. In this variety, they are consecutively affected, owing to the obstruction which causes it either cutting off their supply of blood, or preventing the return of it. — The changes which take place in either case are somewhat different, particularly as to the order of their procession. When the blood is sent in insufficient quantity to, or is entirely prevented from arriving at, an organ or part, the effect upon the nervous and vascular organisation of it must be such as to cause its atrophy or death; for the fluid requisite to nutrition and life is no longer supplied to it. But when the return of the blood is obstructed by lesions of venous trunks, or by tumours pressing upon them, or by disease of the heart, an undue accumulation of blood takes place in the capillaries and veins beneath the seat of obstruction; the blood stagnates more or less; the capillaries are distended beyond their powers of reaction, and their tonicity is exhausted; effusion supervenes in the more porous and yielding tissues; the organic nervous and vital power of the part, already impaired by the stagnation of the capillary circulation and the venous properties of the blood, are still further depressed by the progressive effusion and distension; and at last, if the obstruction become complete, the vital manifestations of both nerves and capillaries are entirely extinguished. The varieties which thus proceed from these different pathological states require separate notices.

18. A. *Gangrene from Obstruction of Arteries*. — A *ligature* placed around an arterial trunk, when the circulation is not supplied by collateral or anastomosing branches; the *rupture* of the internal and middle coats of an artery, occasioning obstruction of its canal; *inflammation*, followed by the accumulation of fibrinous lymph in its interior, and obliteration of the vessel; and osseous or fibrinous deposits in its coats or in its cavity; are the circumstances which give rise to this variety. — a. *Gangrene from rupture of the internal coats of an artery* has been described by PROFESSORS TURNER and CARSWELL. The rupture of these coats is obviously the result of pre-

vious disease. But, however produced, it is manifest that the lacerated part, with the lymph effused from it, will often prove a nucleus around which a fibrinous coagulum will form, and increase until the circulation in the vessel is entirely obstructed. The gangrene will be merely contingent upon this occurrence; for the coagulum may not entirely obstruct the vessel; or the obstruction may be complete, and yet the circulation may be carried on by collateral, or by enlarged anastomosing vessels. — An abstract of one of the cases detailed by MR. TURNER will illustrate the progress of gangrene from this cause, as it agrees with one which I had an opportunity of seeing, and in which amputation was performed. About half an hour after rupture of the popliteal artery, no pulsation could be felt in any of the arteries of the foot, nor in the ham. The foot was cold. No pain was excited by pressure on any part of the limb; but cramp-like pains were felt in the calf of the leg. The following morning the foot was pale and cold, and the integuments below the ankle were entirely void of sensation, even when pinched or tickled. The muscles of the foot seemed to have lost their power of contraction. The next day, mottled purple patches appeared on the instep and fore-part of the ankle, and gradually extended over the whole foot, till the surface, by the fifth day, was entirely livid. With the progress of discolouration, the foot swelled slightly, became oedematous, and seemed somewhat warmer. On the seventh day, several tense, globular vesications appeared on the foot, some filled with reddish, and others with pellucid serum. They increased in number, and extended to the calf of the leg. About the ninth day, the soft parts above the ankle were livid, the discolouration proceeding upwards to the calf of the leg, and soon afterwards nearly to the knee. The soft parts adjoining the discoloured skin were swollen, and very painful on pressure, but no redness nor any inflammatory line between the gangrened and living parts appeared. The discoloured parts were completely insensible. The patient had been much reduced by his previous illness; but with the progress of the gangrene, weakness, tendency to faint, copious sweatings, quick and feeble pulse, became very prominent symptoms, which were followed by cough, laborious breathing, and death upon attempting to sit up in bed. — The coats of the artery were found, torn, thickened, and the canal filled by fibrine, lymph, and coagulated blood.

19. b. *Inflammation of the internal coats of an artery*, particularly of one or more considerable branches, is followed by effects similar to those just described; especially if the obstruction of their canals, by lymph and coagula, be complete. Gangrene from this cause has been noticed in the article on *Inflammation of ARTERIES* (§ 29.). It may occur in internal viscera, as well as in external parts, although the evidence of its existence in the former is not so complete as may be desired. The gangrene that sometimes attacks a portion of the lungs may probably arise from this cause, but there is no satisfactory proof of such being the case. It does not, however, appear unreasonable to infer that, in some constitutions and habits of body, inflammation may extend from the substance of the lungs to the blood-vessels themselves — arteries or veins — and that the inflamed part may

rapidly pass into gangrene, owing to the obstruction of the circulation in one or other of these vessels.—Of the occurrence of gangrene of a limb from inflammation originating in a large artery, there can be no doubt, as several instances of this kind are on record. In these cases, the consequent obstruction of the main trunk may be sometimes attended by a partial collateral circulation, which, although insufficient to preserve the vitality of the whole limb, yet may preserve that of a considerable part below the place where the vessel is obstructed. A case illustrating this fact is recorded in the *London Medical Repository*, vol. xviii. p. 119.

20. *c. Gangrene from fibrinous or osseous formations in arteries* — *Senile gangrene* — *Idiopathic, dry, or spontaneous gangrene*.—When these formations are so extensive as to prevent the circulation through the main arterial trunks of a limb, a different route is often not established; the diseased state of the smaller vessels, especially those in connection with the affected trunks, indisposing them to become the collateral channels of circulation.—When an arterial trunk is thus obliterated or obstructed, the gangrene generally commences with a dark brown, purple, or black spot in one or more of the toes, frequently without any previous swelling, or any increased heat or sensibility. Occasionally, a pricking or tingling sensation is felt in the discoloured toes, which are colder than natural, and often numb. The purple or black discolouration soon gains the whole of one or more toes. There is no increase of their size, but rather a diminution of it; and seldom pain on pressure. In some instances, however, increased temperature, sensibility, and bulk of the affected toes precede the changes just described. The discolouration proceeds gradually to all the toes, and thence over the back and sides of the foot. It sometimes extends as high as the knees; but death generally takes place before it reaches thus far. It is seldom preceded or attended by much swelling of the parts, which the gangrene successively invades; but there are occasionally seen a dark redness of the skin, with heat, pain, and slight puffiness or tumefaction. In many instances, particularly when the accession of the disease has been slow, the parts are even wasted before they are struck by gangrene; and, when this has been the case, they are afterwards shrunk, indurated, and dry. In more sudden and rapid attacks, where the obstruction is less complete than in these, Dr. CARSWELL justly remarks that considerable congestion is induced, with the effusion of more or less serosity, whereby the bulk of the foot, and, more frequently, of the leg, is augmented; but even in this case, the toes, the primary seat of the disease, are not increased in size. It is in the progress of the disease upwards that congestion or œdema occurs; that the skin becomes tense and painful; and that the febrile symptoms, if they have not yet appeared, supervene, increase rapidly, aggravate the local affection, and hasten death.

21. This form of gangrene seldom occurs before sixty, very rarely before fifty, and never in young persons. The obstructions found on dissection are ossification of the arteries of the affected limb, and often also of other parts of the body; and a fibrous tissue formed either in the coats or in the canals of the vessel. In these

latter cases, the artery is sometimes converted into a solid or ligamentous cord. Occasionally ossific spiculæ or deposits project into the canal of an artery, solid fibrine having collected around them (see art. ARTERIES, § 63.). Instances of gangrene from disease of the arteries are recorded by SAVIARD, HÉBRÉARD, ANDRY, CHAVALIER, BEGIN, HODGSON, CRUVEILHIER, AVISARD, MARJOLIN, SYME, and others, mentioned in the REFERENCES of this article. Two cases of the disease from ossification together with obliteration of arteries have occurred in my own practice. It has been supposed, that ossification of the principal arteries of a limb, will of itself produce gangrene; but it will not have this effect unless some other cause of obstruction, as narrowing of the canal, fibrinous formations, &c., be conjoined with it. The appearances in my own cases, as well as in those recorded by the other writers referred to, demonstrate this fact. In some of those the obstruction was not limited to the arteries, but was seated also in the veins. In the one examined by M. BRULATOUR, the arteries above the seat of gangrene were partially ossified, their calibre diminished, and their channels filled by solid fibrinous deposits. The coats of the veins were thickened, and fibrinous coagula adhered to their internal surface.—The lesions of both arteries and veins were evidently the consequences of inflammatory action of a sub-acute or chronic kind.

22. *B. Gangrene from Obstruction of Veins*.—Gangrene may arise from this cause both in external and internal parts; but especially in the latter.—*a.* It rarely occurs in the former, as the veins are so numerous, even in the extremities, as to admit of a collateral circulation, although many of them may be obstructed. I had, however, an opportunity of attending a case with Mr. DAVIES (*Lond. Med. Repos.* vols. xxiii. p. 451., and xxiv. p. 51.), in which gangrene of the foot and great part of the leg took place, owing to interrupted circulation in the veins of the limb. On dissection, the femoral vein was found inflamed in the highest degree, and its coats thickened. It was full of coagulated blood. This state extended throughout the iliac vein into the cava, nearly as high as the diaphragm. All the small veins of the diseased limb seemed in a similar state.

23. *b.* Internal gangrene is often owing to pressure upon the veins, especially in cases of hernia and intorsusception. But, in other instances, this cause is rather inferred than demonstrated. Dr. CARSWELL thinks that gangrene of portions of internal viscera, from the pressure of indurated tumours, is not uncommon, particularly in the lungs, liver, and intestines; but it seems to me, that the cause is seated as often within the veins, as external to them—that the obstruction frequently consists in obliteration of their canals, either from previous inflammation, or from coagula formed in them. This is evidently the chief cause of many cases of gangrene of a portion of the lungs; both veins and arteries running between, or in the vicinity of, excavations becoming obstructed, owing to the extension of the morbid action to them. But inflammation or obstruction, particularly of the veins, may have been induced by the transit of tubercular matter, or other morbid secretions, into them, which may either inflame their internal membrane, or coagulate the blood in them; the consequent obstruction causing

sphacelating ulcerations and cavities, or extending those which may have already commenced. In phthisis, attended by a very copious offensive expectoration, containing portions of softened cellular substance and tuberculous matter, or by a dirty brown, or greenish, or greyish sputum, with a gangrenous odour, the existence of one or other of these lesions may be inferred. — In cases of adventitious, cancerous, or other malignant formations, either the pressure of the tumour upon the adjoining veins, or the absorption of a portion of the morbid secretion, causing coagulation of the blood or other obstruction in the veins, sometimes gives rise to mortification of portions of the morbid mass, which may fall off in a state of gangrene or sphacelus.

24. In gangrene from intus-susception, the veins of the mesentery are pressed upon just at the points where the external and internal folds of the duplicature forming the invaginated portion of the intestine terminate superiorly. The consequence of this pressure or stricture is congestion of blood in the incarcerated part, and inflammation at the point of pressure or stricture. When the inflammation is attended by the exudation of coagulable lymph, the adhesion of the strangulating and strangulated portions, just at the point of stricture, is the result, and the latter portion is evacuated in a gangrenous or sphacelated state; and either in one, or in successive portions. When the part is only gangrenous, it generally still retains its form, and the coats may be easily traced in it after maceration. The diameter of the intestine frequently experiences no diminution at the point of separation and union; and recovery may be complete, although a very large portion of the bowel may be lost in this manner. (See art. COLIC, and ILEUS, § 38.)

25. *C. Gangrene from Disease of the Heart.* — It occurs principally in the lower extremities, contingently upon impeded circulation in the veins with effusion of serum into the cellular tissue. Its progress is often slow; but it may be rapid. It is always consequent upon œdema or anasarca of the limbs, scrotum, and labia pudendi. When gangrene is likely to appear, the previously white, tense, and shining skin, becomes mottled with dull red or purplish spots, owing to the congestion of congeries of cutaneous veins. To these succeed bullæ or phlyctenæ, from the effusion of serum under the cuticle. Upon the bursting of these, the skin underneath is dark brown or livid, and is soon converted into an ash grey slough. Increased pain and redness are sometimes present, and either precede or accompany the separation of the dead part. Previously to the injection of the cutis, the temperature of the limb is usually very low; but as this change takes place, and as sloughs form, both the heat and the sensibility of the part are considerably augmented. Febrile symptoms, as well as local inflammatory action of an asthenic kind, often appear, in various grades; and the disorganisation supervenes and extends with increased rapidity. The gangrene may attack several parts of a leg, or even both legs; but it very seldom appears in the feet or toes. It rarely implicates any other tissue than the cellular, always beginning in the more superficial parts of it, to which this lesion is chiefly confined. In addition to the interrupted circulation through

the heart, the veins are inordinately pressed upon by the serum accumulated in the cellular areolæ between them and the stretched integuments; and the return of blood through them is thus further retarded. The distension, also, of the cellular tissue by the serum impairs the vital cohesion and power of resistance it previously possessed, and disposes it to experience a state of asthenic inflammatory action terminating rapidly either in gangrene or in some one of those sloughing abscesses described in the articles ABSCESS, and CELLULAR TISSUE.

26. iv. FROM LESION OF NERVES. — Gangrene has been supposed, by modern pathologists, to be sometimes occasioned by the loss of nervous influence, from injury or disease of the spinal cord, or of the nerves of a limb. TOMMASINI has even supposed that the inflammation of the nerves of a part is the cause of gangrene in all cases of acute inflammation terminating in this manner. But, we have no proofs of the accuracy of these views. Indeed, facts militate against them. There are numerous instances of the loss of the cerebro-spinal nervous influence of a limb, without much detriment to the functions of circulation, nutrition, and animal heat in it, when it has not been subjected to pressure. These functions are entirely dependent, as I have shown many years ago (*Lond. Med. Repos.* May, 1822), upon the supply of the organic or ganglionic nerves to the arteries, and are but slightly influenced by the cerebro-spinal nerves of the limb. Besides, many cases of inflammation of nerves have been observed, but gangrene has been very rarely seen to supervene, and even then, it has arisen from the extension of the inflammation to adjoining parts, more particularly to the blood-vessels. Phlebitis, and even arteritis, especially the former, are most prone to occur in females soon after childbirth; and the great majority of the cases of these diseases I have seen were consequent upon flooding. A similar cause is influential in the production of neuritis; and I have witnessed instances, where the affection of the limb was evidently this latter at the commencement, but complicated with disease of the blood-vessels in an advanced stage. One of these occurred in the practice of Mr. JOHN DAVIES, and was seen by me several times. In it gangrene came on; the limb was amputated by this very able practitioner; and the extent of lesion ascertained upon examination after death. M. DUGÉS (*Rév. Méd.* t. iii. 1824, p. 177.) mentions a case of neuritis, in a female, after parturition, complicated with flooding. The upper portion of the sciatic nerve was the seat of the disease; and the parts in the immediate vicinity soon become livid and œdematous. The dissection demonstrated inflammation of the nerve and gangrene of the adjoining tissues. A similar case is adduced by M. MARTINET (*Rév. Méd.* Juin, 1824). In it, besides distinct marks of inflammation of the superior part of the sciatic nerve, gangrene of the adjoining structures was observed after death, to a considerable extent below the diseased portion of nerve; the affection of the nerve having been anterior to the gangrenous alteration.

27. v. GANGRENE FROM VARIOUS PHYSICAL AGENTS. — (a) Severe contusions, or other local injuries — (b) powerful stimulants or irritants, or other chemical agents — and (c) excessive heat or cold — either directly or indirectly cause the

death of the parts on which they act. — *A.* The first of these falls within the province of the surgeon. It may, therefore, be only remarked that, when the injury is very severe, nervous influence and circulation may be so entirely annihilated as to prevent the return of action, and to cause the immediate death of the part. Contusions from spent shot &c. are often followed by this effect. But when the injury is less violent, the capillaries of the part have their tonicity impaired, and become congested; reaction of the larger vessels supervenes, owing to the consequent obstacle to the circulation, and to the effects of the injury on the adjoining parts, and increases the congestion of the capillaries; and the effect of this reaction, upon the injured and congested capillaries, is to exhaust their remaining vital endowment, and to produce gangrene of the part. In these cases, the surrounding tissues are inflamed; a separation of the gangrened portion takes place, as soon as its vitality is altogether extinguished, and as the lymph effused by the inflamed capillaries limits the extension of the lesion; and the whole phenomena are the same as in sphacelus from very acute inflammation.

28. *B.* Powerful stimulants, irritants, and chemical agents, produce gangrene somewhat differently, according to their modes of action on the living tissues. — Stimulants act more especially upon the nervous endowments of the part, and, by excessive excitation, exhaust them; but they cannot induce gangrene unless they destroy the vital properties of the capillaries; and they can effect this only by previously causing intense inflammatory action, the consequent gangrene being the effect rather of this action than of the stimuli which excited it, although the frequency, and, indeed, certainty, with which the result will follow the cause will much depend upon the kind of stimulus. Thus, both liquor ammoniæ and spirits of turpentine will inflame the parts to which they are employed; but inflammation produced by the former will often pass into gangrene, and that caused by the latter will very rarely terminate in this manner. — The same remarks apply to irritants. These act more directly upon the capillaries, the gangrene being always a consequence of inflammatory action, in some one or other of its states, produced by them. Chemical agents, according to their nature, are often more complex in their operation; some of them both exciting the vital actions, and altering the intimate organisation of the part. Acids, alkalies, various neutral salts, both mineral and alkaline, &c. excite, and soon exhaust or extinguish, the vital properties of the parts with which they come in contact, with a rapidity, and to an extent, according to their concentration or activity. When much concentrated, especially alkalies and acids, they destroy the organisation of the part before its vital properties fully evince the effects produced upon them; the surrounding tissues, however, becoming inflamed, in consequence of the injury inflicted, and of the interruption of the circulation at the point where the obstruction of the vessels by the action of these agents commences. Alkalies produce gangrene very differently from acids. The former soften, dissolve, and combine with the ultimate organisation of the part, and render its fluids still more fluid; the latter constricts, corrugates, and condenses the

structure, and coagulates the fluids in it. Both ultimately destroy the intimate constitution of the solids and fluids, and thereby annihilate the properties or functions resulting therefrom; but in the different ways just stated. The surrounding parts become inflamed owing to the obstruction at the limits of disorganisation; the vascular action varying somewhat in degree, and perhaps also in kind, with the nature of the agent, the extent of injury, and the circumstances proper to the individual. — When sphacelation results — for sphacelation is the effect rather than gangrene, particularly when these agents are concentrated — the colour varies according to the agent and quantity of blood in the part on which it has acted. A lighter colour of the dead part is produced by alkalies than by acids; a dark brown or black hue following the latter, particularly when applied in a concentrated state to mucous or vascular tissues. Alkalies generally produce a greyish, yellowish grey, or ash colour of the parts which they destroy.

29. *C.* Gangrene from Extremes of Temperature. — *a.* Excessive heat, if it be no greater than 220° or 230°, vesicates the part, and produces gangrene by the inordinate excitement of the nerves of the part, and the consequent vascular action. Higher grades of heat excite the nerves and capillaries still more intensely, and exhaust their vital properties with greater rapidity, the contingent sphacelus appearing more quickly and extending more deeply. In proportion as the temperature is increased, so is the consequent gangrene more entirely the result of the operation of heat, and less the effect of inflammatory action; the higher grades annihilating the vital properties, as well as destroying the structure of the part before reaction can take place in it. But, in most instances, unless death follow in a very short time, inflammatory injection and reaction in the surrounding tissues appear, and increase the extent of the gangrene and of the consequent sphacelus. — When the injury is not such as to occasion death in two or three days, the sphacelated part is separated from the living, and an abundant suppuration takes place from the living inflamed surface; but this seldom occurs in less than five or six days. The loss of substance is generally only partially repaired; a fibro-cellular tissue being formed, which contracts as it becomes more fully organised, occasions deformity, and interrupts the functions of the part.

30. *b.* Intense cold acts very differently from excessive heat in the production of gangrene. It affects chiefly the vital functions of the organ, and does not occasion disorganisation although it causes congelation of the fluids and soft structures. Gangrene seldom follows a diminution of temperature short of producing congelation, unless as a consequence of the inflammation intermediately occasioned. When the cold is great, the parts exposed to it, especially those furthest removed from the centre of circulation, have their vascularity diminished, and become pale, constricted, and numb. Motion and sensibility are afterwards lost, and the parts are even frozen in the more extreme cases. If the exposure to the cold continues, the congelation advances; the functions sink progressively, and a state of apathetic lethargy comes on, terminating in unconsciousness and death (see art. COLD). In this case, gangrene

is not developed. It is not until the frozen part is thawed, or exposed to heat, that gangrene is manifested. The vitality, reduced or extinguished by the diminution of temperature, cannot be restored in all the affected tissues. The blood becomes again fluid, but it has lost its crasis, and separates into serum and coagulum in the smaller vessels. Sensibility, motion, and animal life do not return. The skin covering the part assumes a livid or brownish red colour; phlyctenæ appear on its surface; with grey, purplish, or black spots, indicating the passage of the gangrene into sphacelus. The living parts closely adjoining the gangrene are now injected and inflamed; the vascular reaction which they experience exhausting the remaining vital properties, especially of the capillaries, and extending the mortification, as in gangrene from inflammation. In slight cases, although congelation may have taken place, the circulation and sensibility of the part is often restored; a tingling or pricking sensation is felt; reaction supervenes, and even becomes excessive; and, owing to previous reduction of vital power, and the consecutive action, exhaustion of the affected structure, followed by lost power of the capillaries, diminished cohesion of the tissues, coagulation or other change of the blood in them, and by gangrene, soon afterwards appears. In these cases, the external changes are altogether similar to those just described; but the extent of mortification depends upon the constitution of the patient, and the violence of the antecedent and attendant inflammation.

31. vi. GANGRENE FROM POISONS. — The poisonous substances to which attention will be here directed, are — 1st. Diseased vegetable productions; 2d. Diseased or decomposed animal matters; and, 3d. The poisons generated by certain animals. — *A. Gangrene from Diseased Grain* is sometimes seen among those who live chiefly on rye. Of the general effects of this and of other grains, when used in a diseased, unripe, injured, or mouldy state, some notice is taken in the article *ERGOTISM*. But the influence of *spurred rye* in causing gangrene requires a particular notice at this place. *Spurred rye*, when used with the sound grain as food, produces, according to the quantity, somewhat different effects — either *convulsive* ergotism, or *gangrenous* ergotism. But both these species of disorder may be associated, or the former may be followed by the latter, either of them existing in various grades. Indeed, the gangrenous disease is generally preceded, or even attended, by some degree of spasmodic affection.

32. *A. Gangrenous Ergotism — Necrosis ustalaginea*, SAUVAGES — *Gangrène des Solognois* — has been observed both sporadically and epidemically. It has been supposed that the epidemics which appeared in various parts of Europe during the middle ages, and were denominated *Ignis Sacer*, *Saint Anthony's Fire*, *Mal des Ardens*, &c., were occurrences of this variety of ergotism in a severe as well as epidemic form. The gangrene and separation of the limbs mentioned with respect to them countenance this supposition. It was not, however, until the epidemic of Hesse, in 1596, that the effects of spurred rye on the œconomy were fully recognised by physicians. In 1630, an epidemic gangrene appeared in Sologne, and was traced to this cause by THUILLIER.

Subsequent occurrences of this malady, in different parts of France, Switzerland, and Germany, have been described in connection with this cause, by PERRAULT, DODART, BRUNNER, NOËL, LANG, DUHAMEL, SALERNE, READ, and others. — The experiments performed by TIESSIER in 1780, and the facts detailed by IANSON in 1818, have further elucidated this subject.

33. Gangrenous disease from the use of spurred rye generally commences with vertigo, faintness, diminished sensibility, and slight convulsive or spasmodic movements — with the chief symptoms of spasmodic ergotism. But it is sometimes not preceded by any of these. In this case, it is ushered in by lassitude and weakness of the lower extremities, with deep-seated pain, increased by heat, and aggravated during night. There are occasionally, at this period, slight swelling, but without redness; and, in some instances, even a wasting of the extremities. The temperature, motions, and sensibility, of the parts are afterwards lost, although the deep-seated pain still continues. The integuments now become wrinkled from the shrinking of the parts contained by them. Phlyctenæ appear on the surface; the skin assumes a violet, livid, or black hue — not, however, in all the places affected, but first in the heel, feet, or various parts of the thighs or legs. Sometimes the gangrene extends from the upper portions of the limbs to their extremities; or from the more internal structures to the integuments; and in other cases it proceeds from the toes upwards. When it reaches the trunk, and often before it advances so far, the patient sinks. It generally proceeds gradually, and is not limited to the lower extremities, the upper being often affected. When it is arrested, an inflammatory circle forms around the dead part; and, at the points of separation, an abundant and very fetid suppuration is established. — The gangrened portions are dry, hard, and shrunk. A whole limb may be thrown off in this state without the loss of a drop of blood.

34. Gangrenous ergotism seems, from the early effect produced by its cause upon the nervous system — from the spasmodic contractions, insensibility, weakness of mind, and fatuity, often accompanying it — to arise, in a great measure, from lesion of this system. The circulating fluids are evidently also deteriorated; the affection of the nervous system being probably caused by the change in the blood. Whatever that change is, it may be supposed to affect also the blood-vessels, particularly those most removed from the centre of the circulation. But the vessels, as well as the internal viscera of persons who have died of this disease, have not been investigated. In this state of ignorance as to the morbid appearances after death, several opinions have been hazarded as to the nature of the alterations which terminate in this manner. Some suppose that inflammation of the blood-vessels is produced; and others contend that the existence of inflammatory action is not indicated by the descriptions given by observers of the disease. Without the data furnished by the minute examination of the blood-vessels and nerves after death, all speculation as to the nature of the disease must be inconclusive.

35. *B. Gangrene from Diseased or Decomposed Animal Matters*. — Mortification may take place

from these causes in one or other of the following circumstances:—1st. It may result from the absorption of gangrenous or morbid matter from a different part of the same frame; in which case the consecutive gangrene is generally seated in some internal organ, as the lungs, spleen, liver, &c.—2d. It may follow the application of putrid or diseased matter to an abraded surface, or by puncture, as in dissection, wounds, &c.—3d. It may be occasioned by exposure of a wound or sore to foul air; or by the constitutional affection produced by the respiration of air loaded with decomposed animal matter, as in hospital gangrene:—and, 4th. It may follow the contact of a diseased secretion, either with or without abrasion of the cuticle. I shall consider separately gangrene occurring in each of these ways.

36. *a.* When mortification follows compound or other fractures, or amputations, inflammation, &c., a similar occurrence to that which I have noticed, when treating of abscesses (see art. *ABSCESS*, § 27.), may take place—a portion of the sanious fluid may be carried into the blood, and give rise to internal gangrene, without any appearance of previous inflammation of the consecutively gangrened part.—Upon examination after death, this part is found in some instances livid, brown, or black, in one or more circumscribed portions, and somewhat condensed, particularly if the lungs be the organ thus consecutively altered; and in others of a dirty grey or slate colour, and soft or pulpy. Occasionally this latter state appears to have been the advanced stage of the former.—In several cases, the diseased part is reduced to a sanious, or almost fluid condition; and changed to a reddish brown, or dark brown colour. In all these states, the surrounding tissues may not be at all changed; the gangrened portions varying in size and in number.—In these cases, the sanious matter, which has passed into the circulation, has induced congestion of a portion of an internal parenchymatous organ, and so impaired the vital properties of the congested capillaries, as well as of the organ itself, as to cause them to pass directly into a state of gangrene, without intermediate reaction of the vessels, either in the affected part or in the surrounding structures. The above states of *consecutive gangrene*, I have seen after sphacelation affecting the extremities, or parts pressed upon in low fevers, especially those covering the sacrum.

37. *b.* The application of putrid or morbid matter to an abraded or punctured part often produces a septic or contaminating effect, especially upon cachectic or previously disordered constitutions. Putrid vegetable or animal substances, and various morbid secretions, when thus applied, may occasion, in the first instance, erysipelas, or diffusive inflammation of the cellular tissue, quickly passing into gangrene. The wounds received in dissections, particularly of stale subjects, or of bodies dead more than twenty-four or thirty hours, are sometimes followed by gangrenous inflammation of the cellular tissue, attended by irritative or low fever. The disease, caused by wounds or punctures received in the examination of recently dead bodies, particularly those who have died in the puerperal state, or from inflammation of serous membranes, although much more dangerous than that which occurs in the

foregoing circumstances, is seldom attended by gangrene even in fatal cases (see *POISONS—Animal*); or if it be, this lesion is the least important part of the malady.

38. *c.* Wounds, injuries, and sores are not infrequently affected by gangrene in circumstances favourable to the contamination of the air, to imperfect ventilation, and to the production of humidity, in the apartments where persons thus injured are confined.—*Hospital gangrene* is most frequently generated in this manner; for, although the fluids of the diseased part will produce it, when they come in contact with an abraded surface, or possibly, even, when they are for any time applied to the sound skin, yet I believe that it is chiefly owing to the solution of putrid animal miasms, in the humidity of the surrounding air, that the disease is communicated in the wards of an hospital. Hence the mischief of wetting the floors of wards too often, when numbers are confined in them with injuries, &c., as respects the production both of erysipelas and of gangrene.—I am of opinion, that the close and foul air generated by the discharges from suppurating or gangrenous surfaces, will favour the production of gangrene, in injured parts, by lowering vital power and deteriorating the circulating fluids; and thereby inducing a state of system similar to that in which putro-adynamic fever originates, or by which it is characterised.

39. When *hospital gangrene* commences in a sore or part with which the foul air comes in contact, it is evinced by a change of colour, which, however, differs in different cases. In some, it begins with a certain degree of pallor, and the exudation of a dirty, pale grey matter, occasionally interspersed with specks of blood. In other instances, it presents a livid hue; and, in nearly all, it is swollen and painful. The surrounding parts soon undergo similar changes: the integuments have an erysipelatous appearance, and, with the subjacent cellular tissue, are soon converted into spongy, dirty grey sloughs. The separation of the sphacelated parts is generally attended by an exudation of blood, or by more copious hæmorrhages, owing to the adynamic state of constitution preventing the inflamed part from forming coagulable lymph, whereby the extension of the gangrene may be limited, and the hæmorrhage prevented. The state of asthenia or putro-adynamia, produced by the causes just named (§ 38.), favour the extension of the mortification, the further contamination of the blood and the recurrence of hæmorrhage. When a considerable vessel is destroyed, the absence of coagulable lymph gives rise to losses of blood, which further sink the patient; and a recourse to the tourniquet, in order to arrest the bleeding until the vessel is tied, accelerates the death of the limb, which soon becomes swollen, completely sphacelated, and intolerably offensive.*

* Mr. COPLAND HUTCHISON, in a most instructive chapter on Hospital Gangrene, in his *Surgical Observations*, details a case of a man, who had been the subject of extensive exfoliation of the left parietal bone, exposing the *dura mater* to the extent of two square inches and a half, and who was infected by hospital gangrene of the exposed part. In about three days the *dura mater* was destroyed, and the brain itself attacked. The brain came away, broken down in its structure, as if it had been mixed with dark coloured vinegar, and emitted a disagreeable sour gangrenous smell. The man lost half a tea-cupful of brain before fever and delirium came on. He died on the

40. *d.* The morbid fluids and secretions of several of the lower animals often produce very serious effects when applied to the denuded surface, or even to the sound skin; and these effects are generally attended or followed by gangrene of the part with which they come in contact. The occurrence of *Malignant Pustule* (see the article) is an illustration of this fact. The application of the blood or raw flesh of a diseased animal to a part will often occasion gangrenous inflammation of it, although the flesh of these animals may be eaten with impunity when cooked. Of this, various instances have been adduced by MORAND, DUPUY, LEURET, HAMONT, and others. I believe that, in all cases of the production of gangrene by morbid secretions and other fluids—whether of the lower animals or of man—the local as well as the constitutional effects produced by them are most virulent, when they either proceed directly from the living animal, or act very soon after death; and that they are less injurious when they have undergone the changes constituting incipient putridity or decomposition.

41. *C. Gangrene from poisons generated in healthy animals*, as in the viper, rattlesnake, &c., commences and proceeds with amazing rapidity, upon insertion of the poison, and with remarkable depression of the vital manifestations of the constitution, as well as of the part thus inoculated. The insertion of the poison induces intense pain, which rapidly extends; swelling and hardness of the cellular tissue; dark redness at the point of injury, soon followed by a spreading livid discoloration; and diminution of temperature.—The skin is rapidly covered by phlyctenæ; the cellular tissue becomes soft, and crepitates on pressure; and the puncture discharges an offensive sanious fluid. Almost immediately upon inoculation of the poison, and co-ordinately with the rapidity and extent of the local action, an intense effect is produced upon the whole frame (§ 50.).

42. II. OF THE CONSTITUTIONAL SYMPTOMS OF GANGRENE.—The states of vital manifestation throughout the system, vary somewhat in each of the forms and circumstances, in which gangrene and sphacelus appear. I shall, therefore, take a very brief view of those which are usually seen in most intimate union with each of these forms.—*A. Mortification from inflammation* presents no uniform relation to the severity of the local action, or of the sympathetic constitutional disturbance, although such relation obtains in a general way.—Inflammation of much intensity, in a constitution previously debilitated, or in a habit of body already cachectic, or during a deteriorated state of the circulating fluids, is always more or less liable to terminate in gangrene. Its occurrence also, in a highly sanguine, irritable, and plethoric state of the system, particularly when this state has been induced by living highly, or by the excessive use of intoxicating liquors, is a no less unfavourable circumstance; and, equally with the foregoing liabilities, should be taken into account when symptoms indicative of this termination appear. In the former class of occasions, in which gangrene may occur, the

inflammation, although slight or limited, may nevertheless be excessive, relatively to the state of vital power and of resistance to injurious impressions or actions: in the latter, there is always a disposition to intensity of action so great as to quickly exhaust the vital properties of the vessels; if this intensity be not promptly reduced, and the consequent exhaustion either anticipated or promptly met by local or general means appropriate to the peculiarities of the case.

43. To detect the commencement of gangrene in any internal viscus is by no means so easy as it has been represented by many writers, who, merely copying or compiling from one another, have thereby often perpetuated error. The *sudden sinking*, so often insisted upon, attends various other pathological conditions besides gangrene; and, even when it is observed in connection with this lesion, it may be the attendant of that change in the state of vital power, of which gangrene is only one of the remote consequences.—When this symptom appears somewhat suddenly, it indicates one or more of three states;—*α*. It may depend upon the depression of organic nervous power, generally as well as locally;—*β*. It may arise from commencing gangrene;—*γ*. And it may be caused by the passage of morbid or putrid matter into the blood. The *pulse* varies on the accession of gangrene, with the previous grade of local action and of attendant fever. When action has been very high, the pulse retains its frequency, but becomes weak, small, soft, and very compressible, and ultimately irregular, intermittent, or even slow, just before death. When there has been but little previous fever, the pulse is very feeble, undulating, unequal, intermittent, and slow; but it is readily affected, in either case, by mental or physical impressions. The *animal heat* sinks rapidly with the pulse when gangrene supervenes; the extremities becoming cold, and the surface covered with a clammy perspiration or sweat, which is cold and raw as dissolution draws near. If the antecedent symptomatic fever have been slight, the *mind* may be undisturbed to the very last; if severe, delirium, picking at the bed-clothes, stupor, coma; accumulations of mucous sordes on the tongue, teeth, and lips; foetor of the breath, and even of the body; and unconscious evacuations, for a longer or shorter time before death, are not infrequent.

44. Besides these, various other symptoms appear, but without any uniformity or constancy. These are, faintness or syncope, particularly when the head is raised; hiccup; vomitings, sometimes without severe retchings, or a passive rejection of matters from the stomach; a peculiar gangrenous odour exhaled from the body, and from the excretions; a sunk, collapsed, pinched, and cold state of the features; a dusky, lurid, and sometimes a jaundiced, appearance of the skin; tympanitic distension of the abdomen; offensive eructations; an emphysematous state of parts; wandering delirium, especially at night, or various passing delusions; tremblings or shudderings; and restlessness, or laborious hurried respiration. An offensive gangrenous odour of the expired air is very remarkable when gangrene occurs in the lungs; but it may accompany this lesion in any other part, if a portion of the morbid or decomposed matters pass into the circulation. In this case, all the excretions—pulmonary, cutaneous,

10th day from the attack of the gangrene. The whole of Mr. C. HUTCHISON's observations on this disease are results of most extensive experience, and are very interesting.

intestinal, and urinary—will be rendered more or less offensive, and they may even exhale a gangrenous or putrid fœtor.

45. *B.* In *mortification from debility*, or from *deficient or unwholesome food*, not only are the vital manifestations generally impaired, but the fluids and solids also are frequently in a state of obvious disease, before gangrene occurs, particularly in low fevers, scurvy, &c. In such cases, the general adynamia, as well as the deterioration of the fluids and solids, are rapidly augmented with the accession of this lesion, and most of the symptoms already noticed are also superadded. The pulse, temperature, and mental powers are affected in the manner just described. The previous and attendant asthenia, and the consequent alterations in the blood—which is incapable of coagulating, as it escapes from the diseased part—favour the recurrence of hæmorrhage, the extension of sphacelation, and the further contamination of the fluids from the transit of putrid matters into the circulation, by preventing the formation of coagulable lymph. The more obvious effects of these states are, accelerated sinking of the vital functions, offensive diarrhœa, and various other contingent phenomena, mentioned above (§ 44.), as indicating approaching dissolution. — When *inflammation of the nerves* seems connected with the production of gangrene, great pain, high irritative fever, watchfulness, &c. precede the sinking, irritability of stomach, and weakness or irregularity of pulse, attendant upon this change.

46. *C.* When *obstructed circulation in the arteries* occasions gangrene, the symptoms depend very much upon the cause of obstruction. — *a.* If *acute arteritis* (see ARTERIES, § 27. *et seq.*) produce it, severe inflammatory or irritative fever precedes it, and, on the accession of it, changes into fever of a lower type; watchfulness, sometimes delirium, and most of the symptoms already noticed, supervening. — *b.* When *ligature or rupture of an artery* causes gangrene, the constitutional affection is not severe at first; but in two or three days, or in a shorter time, fever of a low type appears, with more or less disturbance of the nervous system, occasionally with delirium, discolouration of the general surface, and sinking of the vital powers, until either dissolution follows, or restoration and separation of the gangrened part takes place. — *c.* In cases of gangrene from *ossification and obstruction of the arteries*, the constitutional symptoms increase slowly until they ultimately indicate great prostration of the vital powers. In some instances, the progress is at first slow, and afterwards very rapid. In an early stage of the gangrene, slight irritative fever is sometimes observed; but discolouration of the surface, diarrhœa, sinking, hiccup, irritability of stomach, and the other usual attendants on sphacelation, afterwards appear; the progress of the constitutional affection being seldom arrested, or the separation of the dead parts effected.

47. *d.* Whatever peculiarity *gangrene from obstruction of the veins* presents as to the constitutional symptoms, belongs entirely to the nature of the obstruction. — If inflammation of the veins have occasioned it, the symptoms, local and general, of phlebitis will have preceded it, and the advanced phenomena will not differ from gangrene consequent upon internal inflammations,

excepting that the powers of life will be more disposed to rally, and to separate the dead from the living parts. — Gangrene caused by *pressure upon the veins*, often takes place without any previous or attendant febrile action; the vital depression and other symptoms of this lesion supervening upon the congestion, serous infiltration, &c. more immediately produced by the obstruction. — *e.* *Internal strangulations*, however, and *intus-susceptions* of a portion of the intestinal canal, give rise to a different train of symptoms. In these, the pressure acts also upon the nerves and arteries; and the exquisite pain and tenderness, irritative fever, restlessness, and vomitings, followed by cessation of pain, by singultus, eructations, faintness, cold sweats, extreme weakness of pulse, &c., indicate the accession of gangrene. — *f.* *Interrupted circulation through the heart*, occasioning gangrene, is not preceded by febrile symptoms: the constitutional changes in this variety at first depend upon the disease of the heart, and become subsequently associated with those arising from impeded circulation of blood in the veins, serous infiltration, and the consequent pressure and gangrene. The progress of the local and constitutional affection is slow, but sometimes rapid at an advanced stage.

48. *D.* — *a.* The *action of heat* upon the constitution in producing gangrene, is proportioned to the violence and extent of local injury. — Excessive burning pain, hard pulse, thirst, and the usual attendants upon symptomatic inflammatory fever, follow the less violent injuries from this cause, heighten the local inflammation, and exhaust the vitality of the affected vessels. When gangrene is about to occur, or has supervened, the fever changes to the nervous form, often with delirium or mental agitation, followed by stupor, or convulsions when children are the subjects of this injury. In very severe burns, or where a very large surface has been scalded, these latter symptoms immediately follow the shock sustained by the constitution, from the extensive local injury inflicted; and often terminate fatally in a period varying from a few hours to two or three days. The severity and character of the constitutional affection, however, vary with the state of the patient and the situation of the injury. When the injury is over the great cavities, its effect is much more severe, *cæteris paribus*, than on the extremities.

49. *b.* *Gangrene from cold* is often attended by very slight constitutional disorder, when only the extremities have been exposed or affected, or when the cause has been removed soon after these parts had become benumbed or frozen. But when the whole body has been exposed to cold, particularly in a state of repose, or when the exposure has continued long after these effects have been produced, lethargy, stupor, insensibility, frequently passing into death, generally supervene in succession. It is when local inflammation or reaction appears, in the previously benumbed or frozen part, or in the living tissues adjoining, that fever takes place. But as soon as the inflamed part becomes gangrenous, the fever assumes the nervous character. In this variety, however, as well as in that from burns, the degree of consequent adynamia depends very much upon the previous state of the patient, physically and morally; upon the severity of the injury; and upon the extent

of the gangrene, and the rapidity of its accession and extension. Where want, improper food, and intemperance have already produced their effects on the frame, the constitutional commotion attendant upon the injuries produced by the extremes of temperature, generally presents more of a nervous character throughout, than in other circumstances, with a rapid, small, weak and irregular pulse; and frequently with tremor, delirium, or even both, or with more or less agitation. — *c. Chemical agents* affect the system chiefly by the inflammation they excite in the part to which they are applied; unless the injury is extensive or violent, when the symptomatic effects will nearly resemble those caused by extensive burns (§ 48.).

50. *E. Gangrene from poisons* is always preceded and attended by severe constitutional affection. — *a.* That occasioned by *spurred rye* is generally preceded by lassitude, faintness, weakness of the senses, vertigo, spasms, and symptoms of general adynamia, manifested both in the vital and animal functions. Sleep is prevented, by the severe pains in the limbs. The powers of mind are generally impaired; and, with the appearance of gangrene in the extremities, all these symptoms are increased, until the patient sinks into insensibility, or dies in a state of syncope. — *b. Gangrene from putrid or diseased animal matters* is preceded, as well as attended, by the severe constitutional effects, described in the articles on *Diffuse Inflammation of the CELLULAR TISSUE*, *ERYSIPELAS*, *Malignant PUSTULE* — either of which may be produced by these matters — and more fully elucidated in those on *Putro-adynamic FEVER*, and *Animal POISONS*.

51. *c. Hospital gangrene* is always attended by adynamic fever; and, in the circumstances alluded to above (§ 38.), it is often preceded by more or less depression of nervous and vital power, although rarely by prominent febrile symptoms. Derangement of the digestive functions, sometimes diarrhoea, a quick and feeble pulse, and physical and mental depression, generally usher in, and attend, the early progress of this gangrene. Dr. HENNEN states, that men who had borne amputation without a groan, shrunk at the washing of their sores, shuddered at the sight of a dead comrade, and even predicted their own dissolution, sinking into sullen despair. Towards a fatal close, prostration of all the vital manifestations, faintings, diarrhoea, vomiting, hiccup, delirium, discolouration of the general surface, insensibility, coma, cold clammy sweats, involuntary evacuations, &c. successively appear.

52. *d. The poisons of reptiles* occasion a sense of sinking at the epigastrium, oppression in the præcordia, laborious breathing, vertigo; pains in various parts of the body, particularly in the stomach, bowels and head; vomitings, diarrhoea; impaired vision and sensation; with a small, feeble or intermittent pulse. To these succeed, extreme sinking and anxiety at the epigastrium and præcordia, great thirst, syncope, singultus, offensive foetid breath, a jaundiced or sallow state of the skin, coldness of the extremities and of the general surface, clammy sweats, insensibility, and death, unless the progress of vital depression be arrested by the most energetic means,

53. III. PROGNOSIS. — The prognosis, although generally unfavourable, varies with the different circumstances in which gangrene presents itself; and the extent to which it has proceeded. — *a. Gangrene consequent upon inflammatory action* is commonly fatal when an internal organ is affected, especially when the general excitement suddenly subsides, the pulse becoming quickly feeble, small, or thready; the features pinched or collapsed; the surface lurid, sallow, or livid; the respiration laborious or difficult; and the perspiration or other excretions foetid and gangrenous. Singultus, rejection of the contents of the stomach without effort, syncope, and involuntary evacuations, are indications of the near approach of dissolution. But all these phenomena are often manifestations merely of that state of local and general derangement, of which gangrene is the immediate result, rather than of gangrene itself — at least of gangrene to any extent; for dissolution may take place before this lesion is fully developed. — When this form of gangrene is external, its extent is less an indication of danger, than the character of the constitutional disorder, and the disposition evinced by this lesion to extend. — In all cases, the habit of body, the age, modes of living and previous health of the patient, and the exciting cause and character of the previous inflammation, should be taken into account. If these are favourable, if vital action be not very depressed, and if a disposition to form coagulable lymph and to arrest the disease appear, recovery may be expected.

54. *b. Gangrene from debility, from disease of the nerves, and from obstructions of the arteries or of the veins*, should receive a guarded, if not always an unfavourable, prognosis; for, in these circumstances, although some cases may recover, the great majority will terminate fatally. When it occurs from *ossification and obstruction of the arteries*, or from *disease of the heart*, a fatal result will surely follow; although it may be deferred for some time, in a few instances. — *c.* When it is produced by any of the more common *physical agents* noticed above, a much more favourable event may be anticipated, unless the intensity of the cause, and the extent to which it has acted, have given a very severe shock to the system, have depressed vital power beyond the ability of resistance, and induced low nervous fever with cerebral affection.

55. *d. Gangrene from the use of spurred rye* requires a cautious opinion as to the result; for when the disease produced by this agent has given rise to this alteration, matters will frequently have gone too far to admit even of amelioration. — Nor is the prognosis very different, when the deleterious effects of any of the *animal poisons* mentioned above have become so manifest as to be attended by gangrene. The most energetic means alone can then arrest the progress to dissolution; and these may be rejected from the stomach, or fail, even when retained, of rallying the powers of life. In every circumstance in which gangrene occurs, irritability of the stomach is a most dangerous symptom. — In *hospital gangrene*, however, removal of the patient to a pure air, and an appropriate treatment, at an early stage of the disease, will be attended by success, in the majority of cases.

56. *e.* Of all the circumstances that should be

taken into consideration, in forming a prognosis, none is of greater importance than the disposition evinced by the surrounding parts to limit the extension of the gangrene by the formation of coagulable lymph. This should be viewed as a most favourable occurrence, particularly when the local alteration has not proceeded very far, nor depended upon disease of the heart, as it indicates restoration of vital power, and consequent vascular reaction, whereby the injury may be arrested and partially repaired.—On the contrary, spreading of the gangrene is most unfavourable—1st. As producing a greater extent of exposed surface and of injury by which the constitution will be injuriously impressed;—2d. As arising from progressive sinking of vital power;—and, 3d. As favouring the passage of a portion of the dead or morbid matters of the sphacelated part into the circulation, and the consequent contamination of the whole frame,—circumstances exerting a most powerful influence in hastening a fatal result, especially if asthenic inflammation, general adynamia, or an animal poison, have occasioned the gangrene.

57. IV. TREATMENT.—i. The means of cure in gangrene refer—*first*, to the removal of the pathological condition which occasions it; *secondly*, to the state of vital action in the vicinity of the dead part; and, *thirdly*, to the state of constitutional disturbance.—A. If gangrene have been caused by *inflammation*, especially if it have proceeded to sphacelation, the state of constitutional power will then have become so far impaired after the more sthenic forms of inflammatory action, and so much the more reduced after the asthenic, as to require a very different mode of treatment from that which would have been quite appropriate, before the gangrene had taken place.—a. Although the part is about to pass, or has just passed, into gangrene, after the more sthenic states of inflammation, *bloodletting* may still be practised, but with caution, particularly in robust or plethoric persons, or when the pulse still continues hard or strong, or when the gangrene is external. In these circumstances, excessive vascular action, if not subdued by a moderate depletion, would exhaust the remaining power of the vessels of the part or of the surrounding tissues; and the extension of the lesion would be thereby caused with as great rapidity as in cases characterised from the commencement by deficiency of power. It is very different, however, when the gangrene has followed the more asthenic states of inflammation, or occurred in persons living in unhealthy situations and in very large cities; or when it has appeared in the dissipated and intemperate. Bleeding cannot be resorted to in these circumstances, and even lowering *purgatives* should be avoided. Yet recourse to purgatives is indispensable; the warmer or more restorative kinds, or a combination of them with tonics, being most appropriate.—In some instances, particularly when biliary collections may be presumed to have formed in the gall bladder or ducts, and when the part is merely in the incipient stage of gangrene, an *emetic* will precede the exhibition of a purgative with much benefit, especially in autumn.

58. b. It is principally when gangrene has just commenced, and been caused by the more acute forms of inflammation, in young or strong persons,

that the *antiphlogistic regimen* should be prescribed; or, whilst the pulse still retains tone, and the surface presents an increase of temperature, the local change not having yet become associated with a general diminution of vital power. In this state, *diaphoretics*, conjoined with *opium*, or other *anodynes*, are also of much service, particularly after morbid secretions and fæcal accumulations have been freely evacuated by purgatives. They equalise the circulation, and, if judiciously selected, they improve the state of the blood; whilst the narcotic allays the morbid sensibility of the nerves of the part, and the general irritability of the system attending the early progress of this lesion. The nitrate of potash, subcarbonate of soda, with the spirits of nitric ether, and tincture of opium or of henbane, may, therefore, be prescribed in the camphor mixture, if the temperature of the skin continues above natural; or the same medicines may be given in the decoction of bark, or in the infusion of valerian, if the heat of skin be somewhat less. When the abdominal secretions are morbid, two or three grains of calomel, with as many of James's powder, may be taken at night, and a stomachic aperient the following morning, the solution of the acetate of ammonia, with the acetate of morphia in camphor mixture, or any aromatic water, being used during the day.

59. c. Internal gangrene is very rarely attended, even at its commencement, by a state of vascular action, requiring antiphlogistic remedies. It is chiefly when gangrene follows local injuries, in robust constitutions, and violent inflammation, or when it is attended by considerable excitement, that the above or similar measures are necessary. In other circumstances—as when it is consequent upon asthenic action, or when the antecedent inflammatory fever has assumed a lower grade—the treatment ought to be different or modified according to the states of action and of vital power. Surgical writers on gangrene, even up to the present time, have concerned themselves chiefly with the external manifestations of this lesion, without sufficient reference to the states of vascular action and of vital energy—to the changes in the organic nervous influence, in the circulating fluids, and in the abdominal secretions, which both favour its occurrence, hasten its progress, and modify its conditions. Hence the treatment of it has been viewed by them in a one-sided and an imperfect manner. Instead of agitating the question, as they have done even for ages, as to the propriety of bleeding, or of giving bark, at the commencement or during the progress of this lesion, they should have endeavoured to ascertain, if they did not know; and they should have informed us, if they knew; the circumstances requiring the one or the other, and the stages in which either ought to be employed. It is a matter of some astonishment to see practical writers of the present day differing so widely on this subject as they do—some prescribing bleeding, others cinchona, and many condemning all things besides their own methods or medicines, without considering the pathological states, for which either mode of treatment is most appropriate. The most important means of cure—whether bleeding, stimulants or tonics, amputating, external applications, &c.—have been

recommended for gangrene without sufficient reference to the states of vascular action and of vital power; or to the effect either of them may produce upon these states, and upon the disposition to limit or to extend the local disease; or to the influence they may exert in favouring the contamination of the circulating fluids, or in depurating the blood, and in promoting the functions of the principal secreting and excreting organs.

60. *d.* If the pulse be weak or soft, and the skin cool or moderately warm, the preparations of cinchona, serpentaria, and the muriate of ammonia; or the sulphate of quinine with camphor or ether; or the infusions of cascarilla, or of valerian, or of calamus aromaticus, with the chlorate of potash and chloric ether, will be requisite. At the same time, the excretions should be promoted by stomachic purgatives, as the compound infusions of gentian and senna, with the alkaline subcarbonates, and ammonia. — In a case which was ably treated by Mr. MORLEY of New Cavendish Street, to which I was called, this treatment was immediately efficacious. When diarrhoea is present, opium should be added to these tonics; or the chlorate of lime may be prescribed. In cases where the attendant inflammatory fever is about to pass into the nervous or putro-adyynamic states especially if the gangrene have gone on to sphacelus, the exhibition of these, or of other tonics and stimulants, should not be delayed too long, otherwise the adjoining vessels may not be enabled to exert that degree of sthenic action requisite to the formation of coagulable lymph, whereby the extension of the lesion may be limited, and the absorption of morbid matters and the consequent contamination of the blood prevented. The stomach may become so irritable, when vital depression is not arrested sufficiently early, as not to retain the medicines most likely to be serviceable. This occurrence should be as far as possible prevented, as being most dangerous in itself, and as favouring the passage of morbid matters into the circulation. When it has appeared, I know nothing more efficacious in diminishing it than ammonia, large doses of Cayenne pepper, and opium, generally combined, and given in the form of pill. Warm wine and water, or brandy and water, with Cayenne, or other hot spices; or the acetate or muriate of morphia, with aromatics, may likewise be employed. Upon the whole, inflammatory gangrene, at an advanced stage, or gangrene consequent upon asthenic inflammation, or attended by the usual symptoms of adynamic fever, requires a very similar treatment to that which I have advised in the advanced periods of *Putro-adyynamic FEVER* (see that article).

61. *B.* The constitutional treatment of *gangrene from debility* and deterioration of the circulating fluids (§ 16.) consists chiefly in the exhibition of tonics and stimulants; of the chlorates of potash, and of soda; of camphor, musk, and ammonia, with opium and capsicum; and of the other restoratives mentioned above (§ 60.); and differs in no respect from that advised, in diffusive inflammation of the *cellular tissue*, in the adynamic states of *erysipelas*, and in the typhoid forms of *fever*.

62. *C.* When *disease of the nerves* threatens the production of gangrene, the morbid sensibility

usually present requires the exhibition of opiates in large doses, frequently with camphor, or ammonia, or the subcarbonates of the fixed alkalies and warm aromatics. Even on the threatened accession of this lesion, local depletions may be still required. Purgatives are generally beneficial. Warm anodyne fomentations may be applied to the limb, at this period; and the other external remedies of which mention will be made hereafter should be afterwards employed, particularly if the part pass into sphacelation. In other respects, the treatment should be conducted conformably with the principles developed above.

63. *D.* The treatment of *gangrene from obstructed circulation*, through either the vessels, or the heart, depends much upon the seat and cause of obstruction. — If inflammation of the arteries and veins be concerned in producing it, the means of cure ought to have reference to the states of vascular action and of vital energy, as in gangrene from inflammation; but, in respect to phlebitis especially, vital power and resistance should be so liberally supported, as to enable the vessels to form coagulable lymph, in order to limit the extension of the lesion, and prevent the contamination of the fluids. — When it is caused by *strangulation* of, or *pressure* upon, the veins, the treatment must entirely depend upon the states of vascular action and of vital power. The former ought not to be allowed to continue high, nor should the latter be permitted to sink, without having recourse to means to support the one, and to lower the other. — For senile gangrene, or that arising from *ossification* of, and impeded circulation in, the arteries, little beyond palliation of the urgent symptoms can be effected. The same remark applies to that caused by *disease of the heart*. Opium or the salts of morphia, either alone or conjoined with camphor, musk, ammonia, or similar substances; the alkaline subcarbonates, or the sub-borate of soda, with anodynes; tonics, antispasmodics, or stimulants, conjoined with these; attention to the digestive and excreting functions; the horizontal position; and farinaceous or milk diet may be severally employed in both these forms of gangrene.

64. *E.* *Gangrene from physical agents* should be treated according to existing states of local and general action and of vital power, which have been shown above to differ very materially according to the severity, seat, and duration of the injury. — That caused by *burns* requires bloodletting, if the vascular excitement be great. But action, in these cases, although high, is seldom attended by much power. Therefore vascular depletion should be practised in moderation and with caution; the nervous excitement and irritability of the system requiring the chief attention; for, if allowed to proceed, they increase remarkably the severity and extent of the local injury. When the shock sustained by the constitution has been severe, depletions will be injurious. In these cases, restoratives ought to be administered, generally with opium or other anodynes. These latter are required, in most cases, and they should be aided by such local means as will allay the painful heat and sensibility of the part. In severe injuries of this kind, the alarm of the patient, and the excitement directly produced by them, commonly occasion an appear-

ance of vascular reaction, which may mislead : but it generally subsides in a short time, especially if a full dose of opium is administered. When febrile action appears at a later period — after the immediate shock and alarm have subsided — and is symptomatic of the local inflammation, general or local depletions, purgatives and diaphoretics are then necessary. — The internal treatment of gangrene produced by cold, as well as of that caused by chemical agents, should be directed conformably with the principles already stated.

65. *F. Gangrene from poisons* requires more, perhaps, than any other form of this lesion, the use of internal remedies. — *a.* That occasioned by *spurred rye* is evidently connected with a deteriorated state of the circulating fluids, the affection of the nervous and vascular systems being consequent upon this state. Therefore the means of cure should be directed to the removal of this condition ; and those already mentioned (§ 60, 61.) may be tried with this intention ; especially the combination of the chlorides, with antispasmodics or tonics and narcotics. The opinions of writers who have had some experience in the treatment of this disease are very contradictory. Some advise emetics, bloodletting, and antispasmodics ; others, narcotics and antispasmodics ; and many, stimulants and tonics. This diversity is most probably the consequence of the different effects produced by the same means of cure, in successive stages of the complaint ; and in epidemics presenting somewhat different characters ; the changes thus arising obviously requiring a modified treatment. The means, however, which I have here suggested, or camphor, opium, and the alkaline subcarbonates, seem most deserving of confidence in this variety, particularly if aided by frictions, warm stimulating fomentations, and the warm bath, the alkaline carbonates or common salt having been dissolved in the water. The patient's strength should be supported by light, nourishing, and wholesome food :

66. *b.* The gangrene produced by *animal substances*, in a state of disease or of decay, should be treated very nearly as recommended in the articles on *Diffusive Inflammation of the CELLULAR TISSUE*, and on the adynamic state of *ERYSIPELAS*. The therapeutical indications are the same, namely, to excite and support vital power, and to allay irritability, and thereby to prevent the extension of disorganisation, by enabling the vessels to form coagulable lymph. With these intentions, combinations of tonics, antiseptics, and anodynes are resorted to, especially after morbid secretions have been evacuated by stomachic purgatives, and by enemata ; and camphor, capsicum, and the acetate of morphia are prescribed, when nervous excitement or vascular irritability are very prominent. Ammonia, musk, chlorate of potash, sulphate of quinine, and warm aromatics, or spices, are generally beneficial ; and may be given in various forms of combination, and in conjunction with opiates, according to the peculiarities of the case.

67. *c.* *Hospital gangrene* is the most common variety, and therefore the most important, of this species of disorganisation : in none has a greater difference of opinion existed as to the most appropriate method of cure. It is obvious that a *prophylactic* and *curative* treatment should be based

only upon a correct idea of the causes, in the various circumstances in which this formidable malady presents itself. These causes are — 1st. A cachectic and debilitated state of constitution, generally connected with disorder of the digestive canal and liver ; — 2d. A low, humid, and miasmatic atmosphere, and a damp, and an ill-ventilated place of residence ; — 3d. Insufficient or unwholesome food, and the use of impure water. — 4th. An air loaded with putrid miasms or animal exhalations, as that of crowded hospitals, camps, ships and transports ; — and, 5th. The contact of animal matter or of diseased secretions or discharges, as in using unclean sponges, &c. From what I have seen of the disease, in foreign hospitals, soon after the last war, I infer, that, although the fourth and fifth of these are the most common exciting causes, the others are often more or less influential, either in predisposing to it, or in directly producing it, especially after severe injuries and operations, or when aided by the depressing passions ; and that the causes commonly giving rise to typhoid or putro-adynamic fever will often occasion it, especially in crowded surgical wards of hospitals.

68. *a.* The opinion of DELPECH as to the origin of this form of gangrene, which is very nearly the same with that which I have now advanced, has been called an “irrational conjecture, quite destitute of truth,” by Mr. S. COOPER. M. DELPECH's views are derived from extensive and diversified observation, in both civil and military hospitals, and are neither irrational nor destitute of truth. It surely is not becoming to condemn with harsh censure what cannot be answered by sound argument. Many of the surgical writers upon this malady have hardly looked beyond the local origin of it ; and have limited their curative measures too strictly to the gangrened part. Others have, with greater justice, relied on constitutional treatment, without, however, neglecting such local means as have been found serviceable. The utmost diversity of opinion also exists as to what internal and external remedies are most beneficial. The very inefficient and inappropriate medicines but too often used internally by surgeons in this disease, have proved a principal cause of their distrust of this method of cure ; for whenever the expected result did not follow from the means employed, the cause of failure was not attributed to such means, but to the nature of the malady. It is a matter of astonishment that, with all the reverence with which the doctrines and practice of JOHN HUNTER have been viewed, the most important of both have been very generally neglected, in the treatment of this and other external lesions connected with constitutional disorder. This able man stated, as axioms in pathology, that a certain degree of vital tone or energy is requisite for the formation of coagulable lymph, by which the spreading of inflammation and sphacelation will be prevented ; that where, owing to deficiency of vital energy, vascular action is incompetent to the formation of coagulable lymph, these lesions will extend, and the morbid fluids will contaminate the surrounding tissues ; and that, in order to avoid these consequences, means should be used to increase the vital power of the vessels in the diseased part, and thereby to enable them to form coagulable lymph, by which disorganisation will be arrested. Although the

state of the circulating fluid is overlooked in these views, yet they are correct in the main, and form the basis of a rational and successful practice in this and several other maladies.

69. *β*. Before I proceed succinctly to state the practice I would recommend conformably with these opinions, and with the results of observation. I shall briefly notice the constitutional means advised for this disease by some experienced writers. On the first manifestation of hospital gangrene, *emetics* are recommended by POUTEAU, DUSSAUSSEY, BRIGGS, THOMSON, and HENNEN, and are evidently of service, at this period, when there are signs of biliary derangement. — *Bloodletting* is considered injurious or productive of little benefit by BLACKADDER, THOMSON, and BOGGIE, whilst Dr. HENNEN and Mr. WELBANK consider that moderate depletion is serviceable early in the attack, and in strong plethoric persons; and that the risk of the disease attacking the lancet-wound may be prevented by accurate closure, and by allowing the bandage to remain undisturbed until the cicatrix is completely formed. — *Purgatives* are directed by Dr. BOGGIE and other writers, but they should be warm and stomachic, or conjoined with tonics, stimulants, or aromatics, and exhibited early in the disease. It is chiefly after morbid secretions have been evacuated by the early exhibition of emetics and purgatives, that advantage from tonics and stimulants will be most apparent; and it is probably from an insufficient attention having been paid to this circumstance, that so much difference of opinion exists as to the propriety of using these latter remedies.

70. *Cinchona* alone, or in various states of combination, is praised for its good effects in this disease by BOYER, and numerous experienced writers, whilst HENNEN and WELBANK considers that it is injurious. It is recommended in conjunction with the alkaline subcarbonates by VAN WY, and SAVIARD; and with camphor, by FLAJANI. — *Camphor* is much used in this form of gangrene by Continental practitioners. POUTEAU, CONRADI, WENZEL, and ONTYD prescribe it in large doses. I have seen much advantage derived from it; but I prefer to give it in the forms of combination to be mentioned hereafter. — The *arsenical solution* is directed by OTTO. It may be employed in similar states of constitution, to those in which cinchona or sulphate of quinine may be prescribed. — *Arnica*, *cascarilla*, and various other stimulants and aromatics are recommended by various authors, but they are useful merely as adjuvants of other more active means. — *Acids* are noticed in favourable terms by Mr. S. COOPER, and several other writers; but I have much doubt of any benefit being derived from their internal use. The *hydrochloric* and *nitric acids*, or a combination of both, promise most advantages of this class of medicines. — Of the propriety of exhibiting *opiates* there can be no doubt; and most writers agree on this point, and differ only as to the period of having recourse to them. Dr. THOMSON prefers them in the form of Dover's powder.

71. *γ*. From observation of the results of different modes of practice in hospital gangrene, rather than from my own active experience, I would advise the adoption of a practice consonant with the views stated above. Having evacuated morbid secretions and fæcal accumulations by emetics and warm stomachic purgatives, and di-

rected a small or moderate bloodletting, in such cases only as are attended by excessive action and signs of plethora, I would advise the decoction of bark or the sulphate of quinine, in modes of combination appropriate to the peculiarities of the case. If vascular action continue very much excited, the decoction of bark may be conjoined with the nitrate of potash, the solution of the acetate of ammonia, and the spirits of nitric ether, or with the muriate of ammonia and chloric ether. When vascular action presents diminished tone, the sulphate of quinine may be exhibited in the compound infusion of roses; or in the form of pill with camphor. Where the pulse is weak and quick, the evacuations offensive, and the disposition of the gangrene to extend very evident, the decoction of bark should be combined with the chlorate of potash, and compound tincture of bark; and if anxiety, pain, or irritability be present, the tincture of opium or the muriate of morphia may be added. The great frequency of pulse, and loaded state of the tongue, generally observed in hospital gangrene, even indicate the propriety of having recourse to these and similar remedies, or to wine, in some cases. Regard should also be paid to the previous habits of the patient; and persons addicted to spirituous liquors may be allowed them, but in duly prescribed quantities. If the stomach become irritable, the treatment I have advised above (§ 60.) may be employed, or spiced wine may be given; or soda water, spruce or ginger beer, or Seltzer water, may severally be made vehicles of tonic, stimulant, cardiac, or aromatic substances.

72. If diarrhoea appear, and threaten to exhaust the powers of the constitution, opium, or the compound tincture of camphor, should be given in full doses, with the tonic and antiseptic remedies already mentioned; or the chloride of lime may be used internally with tonics and aromatics, or with camphor, and the warm spices, or administered in mucilaginous and emollient enemata. If delirium supervene, exhaustion of nervous power, with or without deterioration of the circulating fluids, may be inferred to exist; and camphor with opium, or henbane, the decoction of bark, with the alkaline subcarbonates and tincture of serpentaria, wine, and the other remedies recommended for *Putro-dynamic* FEVER, and the low forms of DELIRIUM (see these articles), should be prescribed with a decision commensurate with the urgency of the case. Camphor, in order to be beneficial in hospital gangrene, ought to be taken either in frequent, or in large doses. If vascular action be much excited, it will be advantageously conjoined with the nitrate of potash, or nitrate of soda, or the alkaline subcarbonates, or other saline refrigerants. If vascular action be weak or impaired, and vital power manifestly reduced, it should be combined with the preparations of cinchona, or of serpentaria, or with the chlorides and aromatics. Cascarilla, cinchona, or arnica may be severally employed, in similar forms of combination, appropriately to the circumstances of the case.

73. In this form of gangrene especially, prophylactic measures founded upon a knowledge of the causes specified above (§ 38.) should be strictly enforced; and, as soon as the disease manifests itself, the patient should be removed into a well ventilated and dry apartment, and the

mind encouraged by cheering prospects, and by the confidence of the physician in the extent of his resources. The local treatment ought to proceed, as will hereafter be noticed, conjointly with the above constitutional means of cure.

74. *d.* When gangrene follows the bites of serpents, the viper, or other reptiles, the constitutional symptoms will then be characterised by depression of vital action and power so extreme as to threaten immediate dissolution, and to require the exhibition of ammonia, camphor, capsicum, and other energetic stimulants in large and frequent doses. In cases of this description, recourse should be had to local means (§ 78.) immediately upon the receipt of injury.

75. *ii. Local Treatment.* — *a.* Topical measures ought to be directed with the following intentions; namely — 1st. To restore the tone of the extreme vessels in, or surrounding, the gangrened or sphacelated part; — 2d. To procure the separation of this part as soon as it passes into sphacelation; — and, 3d. To prevent the contamination of the circulation and surrounding tissues by the morbid matters proceeding from its decomposition. Substances calculated to accomplish either of these ends, will generally also attain the others. Their application should, however, not be delayed either until the gangrened part pass into sphacelation, or after this result has taken place, but should be brought in aid of constitutional treatment. Before the discovery of the chlorides, and kreosote, numerous substances were recommended to arrest the progress of gangrene, and to fulfil the intentions just stated. In cases of internal gangrene, measures of this description can but rarely be employed. In gangrene of the lungs, however, the inhalation of the fumes of kreosote, or of the chlorides, or dilute chlorine, has proved of more or less service. A judicious use of these in external sphacelus is frequently productive of decided benefit, as they fulfil all the above indications. Next to them in efficacy, are the turpentine, and the balsams, especially the spirits of turpentine, and the Peruvian balsam. When there are much pain and irritability of the part, opium may be added to the local applications. Many other substances have been recommended to be used topically in gangrene, but I must refer to the well-known work of Mr. S. COOPER for a sufficiently detailed account of them. A glance at the opinions of surgical writers on gangrene will readily show that each has been sufficiently disposed to enhance his own favourite application by depreciating those recommended by others, so that the inexperienced practitioner is bewildered amidst contradictory evidence on the subject. The substances already mentioned, especially LABARRAQUE'S fluid, strong solutions of the chlorides, or of kreosote, or of pyroligneous acid conjoined with kreosote, and spirits of turpentine, with or without this latter, are the most generally applicable. They may be used in the form of wash or lotion, or on the surface of any of the several kinds of poultices commonly prescribed.

76. *b.* In gangrene from animal poisons, the local treatment need not differ materially from that now advised. In this variety, as well as in others, different means have been recommended. The application of arsenic has been directed for phagedenic gangrene, by FABRICIUS HILDANUS and ZINKE; the actual cautery, by CELSUS,

MICHEL, LOEFLER, MURRAY, and others; powdered bark, with turpentine, by KNACKSIEDT; these latter substances conjoined with the muriate of ammonia, by DUSSASSOY; the subcarbonate of iron, by BRANDIS; charcoal, by MARCUS, BEDDOES, and BORNEMANN; the pyroligneous acid by SIMONS; and a strong mixture of camphor in thick mucilage, spread over the part, by SCHNEIDER. In this form of gangrene, more, perhaps, than in any other, it is important completely to exclude the external air from the diseased surface, at the same time that the intentions with which external remedies are employed, should be strictly observed. Therefore, whilst the morbid secretions of the part should be prevented from accumulating, or be corrected by the antiseptics already mentioned, the access of air ought to be excluded by means best calculated to fulfil this end, and to be also the vehicles of antiseptic and stimulating remedies. A thick mucilage may, perhaps, be as advantageously used in this way as any other substance. But this intention is important not only in a curative, but also in a prophylactic, point of view. It is observed by nature in all external sores presenting a disposition to heal. When an eschar can be formed by any application, the end here kept in view may be accomplished by it. Indeed, the substances frequently resorted to in the present day, particularly the nitrate of silver, the actual cautery, and the stronger acids, as the nitric or muriatic, are beneficial by their operation in this manner, as much as by the stimulus they impart to the diseased surface.

77. *c.* The hemorrhage that often takes place upon the separation of the sloughs in phagedenic or hospital gangrene, may be arrested either by the means just mentioned, or by the application of the spirits of turpentine containing kreosote, or of strong pyroligneous acid with the superacetate of lead, or of a concentrated solution of the chloride of lime, or of any of the strong metallic salts.

78. *d.* In cases of the bites of poisonous reptiles, or even of the inoculation of virulent or morbid matter, the application of cupping glasses, or of other instruments by which the air may be exhausted over the seat of injury, was recommended by CELSUS, and in modern times by SIR DAVID BARRY. The ancients, especially the Egyptians, resorted to suction for the removal of these and other poisons, when introduced by bites or wounds; and the practice is general even in the present day, in uncivilised countries; the fact having been well known to them, that the individual administering this sort of aid, will not himself be injured, if no abrasion exist on his tongue or lips. The common procedure in these countries, is immediately to place a ligature above the part where the poison has been inserted, when this can possibly be done, and next to have recourse to suction for its removal. I have seen this practice resorted to on two or three occasions, with success. When, however, it has been too long delayed, or cannot be adopted, ammonia, spirits of turpentine, and various stimulating substances may be applied to the part, as advised in the article POISONS. If gangrene have taken place, the local remedies noticed above, are the most appropriate.

79. *iii.* The Diet and Regimen in gangrene must necessarily be regulated according to the peculiarities of the case; but, in general, a mild, spare, and

digestible diet only should be prescribed. If the patient enjoy not a pure and dry air, he should, if possible be removed to a situation possessing this advantage. His mind should be encouraged, and his confidence insured, by the attention of his attendants, and the bearing of his physician.

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GASTRODYNEA. See article STOMACH—
Altered Sensibility of.

GASTRO-ENTERIC DISEASE. — SYN.

Gastro-enteritis. Gastro-entérite, Broussais.

CLASSIF.—GENERAL PATHOLOGY.

1. The diseases of the stomach and intestines are treated in separate articles. But not infrequently both the stomach and intestines are more or less affected at the same time by inflammatory irritation or action, either primarily, or consecutively of other diseases, although not in the same manner, or in the same degree. — Inflammatory disorder coexisting in the stomach and intestines, although not so common, as M. BROUSSAIS has contended, is certainly very frequently observed, especially in connection with other complaints. Even when appearing as the consecutive ailment, its importance is often so great as to require attention to be directed chiefly to it in forming

the intentions, as well as in selecting the means, of cure.

2. Of the modern writers on Medicine, none has entertained juster views on the subject of gastro-enteric disorder, than Dr. W. STOKES, who has remarked that the pathology of the digestive canal has been but imperfectly understood in these countries, and that consequently a mode of practice productive of injury to human life has been too generally adopted. Several causes have conduced to this:—1st. The importance that has been long attached to disorders of the liver;—2d. The empirical or routine practice, introduced by the writings of HAMILTON and ABERNETHY;—and, 3d. The distrust with which the doctrines of BROUSSAIS have been viewed, owing to the unwarranted generalisations of which they in a great measure consist. If the school of BROUSSAIS have thus gone too far in attributing importance to gastro-enteric disorder, the writers and practitioners in this country have erred as remarkably, in overlooking it almost entirely. When we consider the connections of the digestive mucous surface, with the rest of the organisation, by means of that system of nerves which chiefly supplies it, and the important functions which this surface performs, we may infer that irritations, or inflammatory excitement, commencing in this quarter, will often be reflected on distant, but related organs. In childhood, and in early life, whilst the susceptibility of the system is at its maximum, the disorders consequent upon gastro-enteric irritation are diversified, of frequent occurrence, and often serious; and at later epochs of existence, although they may not be so obvious, nor so common, yet they are occasionally attended by danger. It becomes, therefore, a matter of extreme importance in medical practice, to trace the connection, the priority, and the procession, of morbid action in those parts of the system which are most intimately related to the digestive canal. The practitioner will find, on numerous occasions, disorder of this part associated with that of the cerebro-spinal nervous system, of the respiratory organs, of the heart, of the liver, or of the skin; and, although the affection of the digestive canal will sometimes be consequent upon, or coëtaneous with, either of these related disorders, yet a different order of succession will be much more frequently observed.

3. I. *Connection of Gastro-enteric Irritation or Inflammation, with Affections of the Cerebro-spinal Axis.*—Affections of the brain and spinal cord are often complicated with disorder of the digestive canal. In many cases, the latter is merely functional, and depends entirely upon the intensity and extent of the former; but much more frequently, the affection of the brain is induced by irritation of the gastro-enteric surface. In children, this latter occurrence is remarkably common; and even in adults, a slight degree of disorder of the stomach is often followed by headach, somnolency, and incapability of mental exertion. The occasional dependence of epilepsy in adults, and of convulsions in children, upon morbid action in the digestive canal, is fully shown in the articles upon these diseases. Inflammation of the membranes, or of the substance of the brain, and acute hydrocephalus, sometimes also supervene upon gastro-intestinal irritation; and, in the course of their development, render obscure,

or entirely mask, the primary ailment; for, as LALLEMAND has remarked, as soon as the cerebral affection mounts to such a pitch, as even partially to obscure sensibility, the existence of disorder in the digestive canal is ascertained with great difficulty. I believe that the majority of cases of the affection, recently denominated spinal irritation, are caused by gastro-enteric disorder; chronic irritation in this latter situation being propagated to the spinal cord through the medium of the ganglial nerves communicating with the roots of the spinal nerves. It is of great importance to keep these pathological states in recollection, and to ascertain as far as may be their priority; for when affections seated in the cerebro-spinal axis are consequent upon gastro-intestinal irritation, a treatment directed for the removal of the former without reference to the nature of the latter, may, especially if it be of an exciting nature, aggravate and perpetuate the mischief.

4. This principle has been carried to an extreme length by M. BROUSSAIS, who has proscribed the use of purgatives even in the more dangerous affections of the brain, from the mistaken idea that purgatives will necessarily increase the already existing irritation of the digestive canal, of which he supposes the cerebral disease to be almost always a consequence. This doctrine comprises two assumptions:—1st. That the affection of the brain necessarily depends upon pre-existent irritation of the digestive canal;—and, 2d. That the exhibition of purgatives will increase this irritation, and thereby aggravate the cerebral disease. As to the first of these, it may be answered, with perfect truth, that the procession of morbid action he contends for, is only occasional or contingent upon concurrent circumstances: and, as respects the second, the converse of the proposition is probably the more correct; for a judicious exhibition of purgatives will frequently remove irritation of the digestive canal, especially if it be caused by unwholesome ingesta, or morbid secretions, or fæcal accumulations; and, even when it cannot be referred to either of these, but rather to the state of vascular action in the digestive surface, the augmented secretion procured by refrigerant or mild purgatives may promote its resolution, or diminish its intensity.

5. II. *Connection of Gastro-intestinal Irritation with Disease of the Respiratory Organs.*—a. The association of gastro-enteric irritation with most of the complaints observed in the respiratory organs, is of greater frequency than is generally supposed. Diseases being so universally described by writers and teachers as species of unvarying form, and without sufficient reference to diversity of character and complication, their more important connections and associations with other maladies are completely neglected, and are unknown to the young practitioner until obtruded upon him in practice. The complication of *bronchitis, cutarrh*, and other affections of the respiratory organs with gastro-enteric irritation, has been noticed when treating of these disorders. With respect, therefore, to these, I have only now to remark, that I have seen both forms of disorder follow coëtaneously upon the exciting cause, and that the prior existence of the gastric disorder has often predisposed to the bronchial or pulmonary disease, a very slight exciting cause being suffi-

cient to produce the latter, when the former is present.

6. *b.* During a number of years, I had almost daily occasion, at the Infirmary for Children, to enter against the names of some of the patients, *gastro-catarrhal fever*, or *gastro-bronchitic irritation* or *inflammation*, according to the features of the case, as the names of the affections for which they were admitted. In these, it was difficult, if not impossible, to determine which was the primary disorder; but it was always evident that the complication was attended by much danger, the more especially as it occurred chiefly in debilitated or delicate children, and extended to the bronchi of both lungs. In many instances, the affection of the mucous membrane appeared to be universal, and the progress to a fatal issue was very rapid. Gastro-enteric irritation, although it can scarcely be considered as a cause of *tubercular consumption*, unless when it has continued long, is a very frequent concomitant of the early, as well as of the advanced stages of this malady. I have often observed that, when the former has been aggravated by improper diet or treatment, the latter has also been exasperated. (See TUBERCULAR CONSUMPTION.)

7. *c.* Even the occurrence of *pneumonia* may be favoured by disorder of the digestive canal; and, in this case, the pneumonia may assume a nervous or low character, constituting the *Pneumonia nervosa* of the older writers. The association of disorder of the digestive mucous surface with affections of the respiratory organs, although more generally neglected than might have been expected from the state of science at the present day, has long attracted some attention, as evinced by the notices taken of it by the older and modern writers, by the names *Stomach-cough*, *Vermineous Cough*, and *Dyspeptic Phthisis*. In *hooping cough*, it is often difficult to decide whether the digestive or the respiratory mucous surface be the most affected: the vomiting in which paroxysms of cough terminate in various affections of the chest, is perhaps as much owing to attendant gastric irritation, as to the convulsive action of the respiratory organs. In all cases, therefore, in which we have reason to dread the origin or association of pulmonary, or cerebral disease, with gastro-intestinal irritation, inquiries ought to be made for the symptoms by which this latter is indicated. When pain, tenderness, or tension at the epigastrium, or in the abdomen, are present; and particularly if the pain be increased on pressure, or be attended by nausea, flatulency, or acrid eructations, or occasional vomiting, and an irregular state of the bowels, the existence of gastro-enteric inflammation should be inferred, and the treatment ought to be directed to its removal. The means of cure, also, required for the pulmonary complication should be so devised as not to increase, if they may not diminish, the gastric irritation. The diet of the patient ought to be prescribed with similar intentions. When pulmonary affections are thus complicated, the treatment of them by means of tartarised antimony is frequently injurious, particularly in children, as tending both to aggravate the gastric disorder, and the nervous depression often attendant upon them. Even when pneumonia is thus associated, the tartar emetic may be dispensed with; and, as Dr. W.

STOKES justly advises, the strength of the patient must be supported by a farinaceous food, jellies, and broths, even whilst local depletions, and external derivatives, are being employed. The connection of gastro-enteric irritation with tubercular consumption is one of the most important topics in practical medicine, and one which has been imperfectly understood, and, with a very few exceptions, overlooked, by writers in this country. As the subject, however, belongs especially to this disease, in its practical bearings, it is considered under that head.

8. III. *Gastro-enteric Irritation* often induces severe disorder of the vascular system.—This, perhaps, is the most common occurrence met with in practice. The febrile disturbances consequent upon irritating ingesta are so frequent, and so generally admitted, as hardly to require notice. Amongst children, they are constantly appearing, and almost as constantly are removed by means appropriate to the cause of irritation. If this be indigestible substances, an emetic, or purgative, will be the most efficacious, and by no means the most unsafe, treatment that can be adopted, notwithstanding the horror entertained by BROUSSAIS and his followers of these medicines. In such cases, the disorder subsides on the removal of its cause; but when it is induced by the inordinate use of stimuli, or by other causes that have either ceased to act, or admit not of so ready a removal, it will be better to leave the case to nature, than prescribe this treatment. In these circumstances, *refrigerants*, cooling *diaphoretics*, and mild *sedatives* with *emollients*, are the most appropriate. The nitrate of potash, or the nitrate of soda, the alkaline subcarbonates, the muriate of ammonia in small doses, sulphate of potash, and ipecacuanha, are severally of use, particularly in mucilaginous or emollient vehicles; but the bowels should be kept freely open by mild, oleaginous, or refrigerant purgatives.

9. I have already insisted upon the fact, that purgatives or laxatives, when judiciously selected, will rather diminish than increase gastro-enteric irritation. Some doubts may exist as to the operation of calomel in this way; but an extensive and diversified experience of this substance, and the experiments performed with it by Mr. ANNESLEY, have convinced me that in full doses it diminishes irritation and inflammation in the stomach and small intestines, whilst it increases, or even excites, these morbid states in the large bowels, and depresses nervous power, or augments the general susceptibility and irritability of the frame, especially if frequently exhibited, or continued for a considerable time.

10. IV. The *Connection of Gastro-enteric Disorder with Fevers*, is sufficiently illustrated in the articles on these diseases. It has formed the basis of M. BROUSSAIS' pathology of fever. Little, therefore, need be added at this place respecting it. The fact, however, must be admitted, that gastro-enteric inflammation, in more or less manifest grades, is one of the most prominent and constant phenomena of the invasion of exanthematous fevers; and that a somewhat similar state of vascular injection, or irritation, exists at this period in the stomach, and upper portions of the intestinal canal, to that which subsequently appears on the cutaneous surface:

the former, however, subsiding as the latter becomes developed. This is satisfactorily proved by the character of the symptoms, more particularly by the nausea, vomiting, epigastric tenderness, redness of the fauces, and edges of the tongue, &c. A somewhat similar condition most probably exists in the early stages of typhus and other fevers; but it is in the advanced periods of these, that the gastro-intestinal surface becomes most prominently affected. In exanthematous fevers also, particularly in delicate and cachectic subjects, or when the eruption has not been fully evolved, or has been delayed or suppressed, or has prematurely disappeared, the gastro-enteric disorder not infrequently is the most serious part of the disease, in respect both of the lesions in which it is prone rapidly to terminate, and of the cerebral affection, which it occasionally superinduces. It must not, however, be supposed from this statement, that I consider gastro-enteric irritation, or inflammation, to be the proximate cause or primary pathological condition of fevers. I merely contend that it is often one of the most prominent and important of the several lesions observed in their early stages, but is produced by changes still earlier in the chain of morbid causation.

11. There can be no doubt of the fact, insisted upon by BROUSSAIS and other French pathologists, that erythema, or inflammatory injection of the gastro-intestinal mucous surface, is a very general phenomenon in fevers, and that it may, and very often does, exist without pain, or even tenderness on pressure; but, however intense and prominent it may appear amid the various lesions characterising these maladies, it is certainly not the cause of the changes and symptoms attributed to it by these writers. Inflammatory irritation of this part, as severe as that observed in any form of fever, may exist without fever at all, and still more without the extreme prostration, which they believe it to occasion. The intestinal mucous surface suffers merely in common with all other tissues of the body in the progress of essential fever; but it is much more obnoxious to alterations than any other part, owing to the nature of its organisation, to its relations with other viscera, and to the numerous and diversified causes of irritation to which it is constantly exposed, particularly the morbid secretions, and the incongruous and exciting substances, continually passing over it.

12. *V. Connection of Gastro-enteric Irritation with Hepatic Disorder, &c.* — *a.* I have insisted, in the article DUODENUM, on the importance of attending to disorders of the upper portion of the intestinal canal, and of distinguishing between them and the affections of the biliary organs. Disorders of the stomach extending to the duodenum and jejunum, or even further, have been often treated in this country for diseases of the liver; and it must be admitted that the difficulty of forming a diagnosis between them is great. But the disorders of these portions of the alimentary canal, which are thus liable to be mistaken, are not so uniformly inflammatory as Dr. W. STOKES appears to believe, in his very acute observations on this subject; or, if they be, the inflammation is greatly modified by its connection with nervous asthenia, or other morbid states. — When, however, gastro-enteritis is really present,

two great evils result, as this able physician has remarked, from mistaking it for affections of the liver; — one, the neglect of the actual disease; the other, its exasperation by means supposed capable of removing the hepatic disorder. The consequence is, that the gastro-enteric irritation, being increased by the inappropriate treatment adopted, extends along the ducts, or by nervous and vascular connection, to the biliary apparatus; and thus the disease, which was in the first instance incorrectly supposed to exist, is actually superinduced by the means erroneously resorted to for its removal. M. BROUSSAIS has insisted upon inflammations of the liver being always consecutive of gastro-enteric inflammation. This, however, is one of the several generalisations at which he has arrived from insufficient data. But, until he wrote, the fact that irritation of the digestive canal, allowed long to exist, or to go on to inflammatory action, frequently induces chronic hepatitis, was entirely overlooked. There can be no doubt that prolonged and frequently repeated over-excitement of the digestive canal, by a too rich, stimulating, or full diet, or by spirituous or fermented liquors, is often followed by hepatic disease; but, as shown in the article LIVER, other causes, besides gastro-enteritis, are concerned in producing it. One of the most common circumstances in the production, or exasperation, of intestinal irritation, and of the ultimate supervention of chronic hepatitis, is the improper or too frequent use of acrid purgatives, — a practice to which I have traced a number of the cases of hepatic disorders which I have seen in a warm climate, and more recently in this country, particularly among persons who have returned from the East Indies, or from other places within the tropics.

13. The occurrence of disease of the liver, and even of abscess of it, consecutively upon chronic diarrhoea, and dysentery, has long attracted the attention of most practitioners in warm climates. In many of such cases, although there may have been reason to suppose, that the hepatic disorder preceded, or even caused, the intestinal affection, there can be no doubt that the persistence of this latter, or the exasperation of it, by a purgative treatment, has rendered the former more acute and manifest. Some difference of opinion exists as to the mode in which the gastro-enteric disorder is propagated to the biliary organs. Some suppose that the excitement is sympathetically extended to them, this extension being favoured by the associated functions of these different organs. Others believe that the inflammation has spread from the mucous surface of the duodenum to that of the biliary ducts. Instances have been adduced by ANDRAL, RIBES, BOUILLAUD, and REYNAUD, which favour the inference that inflammation commences in the radicles of the mesenteric veins, and extends along the vena porta, and its ramifications in the liver. This, however, must be a circumstance only of occasional or rare occurrence. I have, however, long since supposed that the more acute attacks of inflammation of the substance of the liver, and the purulent collections frequently formed in it, in the course of chronic dysentery, have been superinduced in this manner. — Upon the whole, it may be inferred, that in complications of gastro-enteric with biliary disorder, either lesion may have been primary. But

that in this climate, especially, the gastro-enteric more frequently precedes than follows the hepatic affection. In warm climates, the converse of this probably obtains, although not to the extent very generally believed by many practitioners who have written on intertropical diseases.

14. *b.* That disease of the *mesenteric glands* is generally induced by the frequent recurrence or persistence of gastro-enteric irritation and inflammation, often connected, however, with various other elements of disorder, is sufficiently evident, and now very generally admitted. And yet I have seen, especially at an early period of my practice, this malady treated by purgatives, sometimes of a very acrid nature. The enlargement and obstruction of these glands, depending chiefly on the affection of the digestive mucous surface, can be remedied only by the previous removal of this affection, and by the prevention of its recurrence. When this end is obtained by local depletions; by refrigerants conjoined with the alkaline subcarbonates, ipecacuanha, and demulcents; and by suitable diet and regimen; the consecutive disease of the glands often gradually disappears.

15. VI. *The Connection of Gastro-enteric Inflammation with Diseases of the Skin*, is much more general than practitioners in this country suppose. It is chiefly owing to the irritation of the digestive mucous surface in various grades of severity, that the cutaneous affection resists so long the treatment prescribed for its removal. I have repeatedly seen cases of eczema, and of other obstinate diseases of the skin complicated with the slighter and more chronic grades of gastro-enteritis, the latter being even so prominent as to be indicated by epigastric pain and tenderness; yet arsenical, or other irritating medicines, were exhibited in no small quantities; and, although they were evidently exasperating both the internal and external affections, they were continued with a perfect belief of their applicability. Upon the adoption, in these cases, of general or local depletions, of refrigerant medicines, of warm and medicated baths, and of a light and appropriate diet, all disorder has soon after disappeared. The chief reasons of diseases of the skin proving so obstinate, are — 1st. This form of complication; — 2d. The inflammatory diathesis and vascular plethora characterising them; — 3d. The neglect of these pathological associations, and the adoption in consequence of inappropriate means of cure; — 4th. Inattention to diet and regimen, particularly as respects the use of animal food, and stimulating beverages and articles of diet; — and 5th. An insufficient observation of the states of assimilation and excretion, with the view of perfecting the ormer, and of promoting the latter.

16. VII. *Chronic Gastro-enteritis is often associated with Affections of the Genito-urinary Organs, and with Gout.* — We sometimes observe leucorrhœa and other uterine disorders connected with gastric irritation; the former most frequently being induced, or favoured in its occurrence, by the latter. Difficult or scanty menstruation is occasionally traced to the same cause. In these cases, the means calculated to relieve the disorder of the digestive mucous surface, are generally most efficacious for removing the sympathetic affection. A similar association of the disorders of the digestive and urinary passages is sometimes

also observed; but it is unnecessary to do more than to refer to it. How far gastro-enteric irritation may influence the states of urinary excretion, has never been so fully illustrated as is to be desired. What we know of the subject is derived from the researches of Dr. PROUT; and it is to be hoped that this scientific physician will proceed in his investigations into it. There can be no doubt that a state of chronic irritation, or of inflammatory erethism, of the digestive mucous surface, will so impede the functions of digestion and assimilation, as to cause a superabundance of materials in the blood, calculated to excite or to disorder the actions of the kidneys, and requiring to be eliminated from the circulation. When this disorder of the gastro-enteric surface is attended, as it not infrequently is, with a craving or morbidly excited appetite, food is taken in larger quantity than it can be digested; and much imperfectly formed chyle is carried into the blood, where it excites disorder of the liver, of the kidneys, and of the skin, in the course of the excretion of the unassimilated matters by these organs. — To this source may be traced, in many instances, not only the morbid conditions of the urine, and of the kidneys themselves, but also the production of an attack of Gout, in a regular or irregular form.

17. The *therapeutical indications*, and even the *means of cure*, for these various gastro-enteric complications, may be readily inferred from what has been stated above. — More precise information will, however, be obtained as to these topics, and as to the *causes* of the gastro-enteric disorder, by referring to the articles GOUT, INDIGESTION, INTES-TINES, STOMACH, &c.

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GLANDERS.

CLASSIF. — III. CLASS, III. ORDER (*Author*, see *Classif.* in *Preface*).

1. DEFIN. — *Vascular injection, and chancrey sores of the membrane of the nose, frontal sinus, and parts adjoining, with a profuse offensive discharge, and pustular eruptions, or tubercular and gangrenous ulcers in various parts, preceded by constitutional disorder, attended by fever of a low or malignant character, and produced by contagion.*

2. Glanders until lately was considered exclu-

sively to belong to the horse, the ass, and the mule. Within these few years, several cases have occurred, showing that it may be communicated to man, in either the acute or chronic form. About twelve years ago, in the course of a discussion at the Medico-Chirurgical Society, I stated, that the fact of the disease having been thus communicated, had been proved by cases that had occurred in Germany. The cases to which I then alluded were published in *Rust's Magazine*, for 1821. Since then, cases have been observed in this country, and published by Mr. TRAVERS, Mr. BROWN, and Dr. ELLIOTSON. It is to this last gentleman, however, that we are most indebted for a full elucidation of the subject, by his able researches. The frequency of the occurrence of the disease in the human subject justifies the notice that will be taken of it in this work.

3. *Acute and chronic glanders* are contagious amongst the animals just mentioned; but from the facts adduced by Mr. COLEMAN, Dr. ASHBURNER, and Dr. ELLIOTSON, it evidently appears that the disease may be generated anew, when horses are shut up in a confined space for a long time, as on board transports. The characteristic symptoms of the disease in its acute form in the horse, are—intense inflammation of the pituitary membrane, attended by erosions which soon pass into chancre-like sores; swelling of the lips and nose; rapid extension of the ulceration, giving rise to a purulent and disagreeable discharge, which often passes to a purplish, or bloody, and horribly foetid sanies; subsequently, gangrene of the nasal membrane, with increased discharge, sometimes with slight hæmorrhage; swelling and pain of the sublingual glands; inflammation of the conjunctiva and nasal eyelid, quickly passing into a livid and swollen state, with an offensive sanious discharge; and fever of a putro-adyneamic or malignant character. As the local changes extend to the adjoining parts, respiration becomes laborious, and the superficial vessels congested, the animal dying in a few days, or after a longer or shorter interval. If the disease is protracted, the symptoms sometimes relax, but the state of the pituitary membrane, and the character of the discharge, show that it has degenerated into a chronic form. Pustules may also appear in the progress of glanders, with gangrene of the external parts of the face, and tumours with swelling of the extremities, the disease being thus associated with farcy, which is a modification of it.

4. The *farcy glanders* generally appear in the form of small tumours about the legs, lips, face, neck, or other parts of the body: these tumours vary in size, and in the rapidity of their progress to ulceration. They sometimes create little inconvenience, particularly in a chronic state; but at other times, they are large, painful, numerous, and rapid in their course. They are at first hard; soon become soft, burst, and degenerate into foul ulcers, with abrupt edges, and of a pale glossy appearance. Lines of communication are generally observed between these tumours or ulcers, particularly when seated on the insides of the limbs: these lines are inflamed and enlarged absorbents.

5. I. DESCRIPTION OF GLANDERS IN THE HUMAN SUBJECT.—Dr. ELLIOTSON remarks that glanders may appear in the human subject in different forms.—1st. In that of *simple acute glanders*;

the disease attacking the nasal cavities and adjoining parts. 2d. In that of *acute farcy glanders*; the malady appearing in various parts, in the form of small tumours, giving rise to foul ulcers, suppuration, &c. 3d. These varieties may exist separately, or they may be both produced at the same time, or the one may precede the other. 4th. Each of them may also occur in a *chronic form*, and, in this form, also, may exist separately, or be conjoined. That the acute true glanders, and the farcy glanders, are the same disease, is proved by the fact, that the matter deposited in the tumours characterising the latter, or that coming from the nostrils in the former, gives rise to either of these varieties, or to them both conjoined; or, in other words, that simple acute glanders may proceed from the matter of farcy, or from its own discharge, and that farcy glanders may arise from the discharge from the nostrils in simple acute glanders.

6. i. *Simple Acute Glanders* appears to commence with rigors, headach, irritability of stomach, depression of spirits, prostration of strength, stiffness and severe constant pain of the joints, aggravated on motion, and great thirst. The patient, moreover, complains of much heat about the nasal organ and windpipe, accompanied with a copious viscid discharge. The nose and surrounding parts become swollen, hot, excoriated, and of a bright red or livid colour; one or both eyes are inflamed, or completely closed; a profuse tenacious mucus, at first of a deep yellow, but afterwards of a bloody or dark sanious appearance, exudes from one or both nostrils, sometimes also from the eyes; and several hard phlyzaceous pustules appear on the nose and adjacent parts, and on the neck, trunk, arms, thighs, and legs. The temperature of the skin is increased; the pulse is remarkably frequent, soft and weak, or undulating; the respiration, rapid, weak, and shallow; the tongue dry, rough, and brownish red; thirst is unquenchable; the stools are watery, or slimy and offensive; the voice is weak, and the mind incoherent or wandering. Copious offensive sweats, a livid or gangrened state of the nose or of adjoining parts, delirium, tremors, and restlessness, are also observed; followed by sinking of all the vital powers, disappearance of the pulse, and death within a very few days; the foetor from the discharges, and from the whole body, towards the close of the disease, being insupportable.

7. *Upon inspection post-mortem*, the morbid appearances, especially those which are external, are greater on one side of the body than on the other. The lungs are engorged with dark fluid blood; the bronchi are livid, congested, and partially filled with a dark frothy mucus; the nostrils and frontal sinuses contain a glutinous matter, of a brownish colour, and the lining membrane is studded with ulcerated white tubercles or granules; irregular ulcers, or white circular chancres, sometimes also exist in the upper parts of the air-passages; purulent deposits are occasionally found in some of the internal viscera; and the mucous surface of the digestive canal is softened and discoloured at various points. White tubercular formations, resembling those found in the membrane of the nose, sometimes also exist in the mucous membrane of the large bowels.

8. ii. *Acute Farcy Glanders* seems to commence

with severe pain in the joints and limbs, and with the other symptoms attending the invasion of the preceding variety. Small tumours arise in different parts of the body, but are more numerous on one side than on the other, and have a glossy red appearance, which soon changes to a dark brown. They also affect the head, or even the face, and chiefly on one side. They are painful, soon crack on the surface, and exude a thin acrid sanies: they vary in size, and are generally accompanied by phlyzaceous pustules in different parts of the body. Perspiration is free, copious, and foetid; and the stools are watery, offensive, or otherwise morbid. The fauces are injected, and of a purplish hue; thirst is great; the tongue foul, loaded, and dark-coloured; the pulse quick, and easily compressed, afterwards small, and scarcely perceptible; and the other symptoms attending a fatal termination soon afterwards appear, as in the preceding form. On inspection after death, the tumours are found deeply seated. On removing the gangrenous integument covering them, a layer of brown glutinous matter is seen covering small white tubercles, having the same appearance as those found in the frontal sinuses, and nasal cavities, in acute simple glanders. These tubercles on the forehead or scalp are generally connected with the pericranium; but, on the limbs, with the fasciæ. — In some cases, on dividing the larger livid or gangrenous tumours, down to the bone, the muscles appear decomposed, are of a dark colour, exhale a peculiar foetid odour, and contain specks of purulent matter, as it were infiltrated through their substance. Underneath these muscles, clusters of circular grey tubercles are also found, firmly attached to the periosteum, and resembling those that are more superficial, as in the pericranium, &c. The muscles generally, even those remote from the tumours, are blanched, flabby, or softened, and the cellular tissue is infiltrated with a yellowish serum. The Schneiderian membrane, frontal sinuses, and parts adjoining, are sometimes thickened, or studded with white tubercles. The blood is dark, fluid, and decomposed; and the heart flabby and pale.

9. When *acute farcy* is conjoined with *acute glanders*, the affection of the nares and respiratory organs, the phlyzaceous pustules around the nose and mouth, and the consequent foetid, sanious discharge, and disorganisation, are associated with the foregoing phenomena; but the constitutional symptoms are not thereby otherwise changed, than in being aggravated, or rendered more malignant, or more rapid in their progress to dissolution. — In such cases, the morbid appearances of the nares, fauces, and respiratory surfaces attending the acute glanders, are superadded to those characterising acute farcy.

10. iii. *The Chronic Forms of Glanders.* — Simple chronic glanders is confined chiefly to one nostril, and is characterised by a glutinous and very offensive discharge, the foetor being peculiar, and remarkably disagreeable. There are itching, with a constant desire to blow the nose, and a sensation of stuffing. In the slightest state of the disease, these may be the principal symptoms; but, in an advanced stage, or in severer cases, there are pain between the eyes and down the nose, with suffusion of the eyes, and ulceration of the Schneiderian membrane; the discharge

being copious, puriform, or sanious. These symptoms are usually preceded by shiverings, giddiness, and by weakness and pains of the limbs; and are followed by more or less constitutional disturbance. As the disease proceeds, purulent collections form in different parts. There are, moreover, loss of appetite, nausea, swimming, or pains of the head, occasionally wanderings of the mind, pains in the back and limbs, thick, discoloured, or foetid urine, and slimy, or otherwise morbid evacuations. From this state, the patient may slowly recover, after an indefinite period, or may sink gradually, from prostration of all the vital powers, with appearances of contamination of the circulating and secreted fluids.

11. *Chronic farcy glanders* are generally preceded and accompanied by chills or rigors, and aching pains through the body and limbs, resembling rheumatism. Tumours gradually form about the face, trunk, and limbs; these break and give rise to an unhealthy discharge; and are attended or followed by disease of the absorbents and glands, or by purulent collections in the joints, or in various parts of the body. The disease may commence in this manner, and thus terminate; or it may pass into the state of chronic glanders; or, in other words, the affection of the respiratory passages characterising simple glanders may be superadded; or, it may commence in this latter form, and be followed by the symptoms more especially marking the chronic form of farcy. In either case, the matter produces, as shown by the experiments of Mr. COLEMAN and others, acute glanders or farcy indifferently.

12. iv. *The Nature of this Disease* may be inferred from the history here given of it. It is evidently the result of a specific morbid matter, contaminating the surfaces and parts to which it is applied, affecting the organic functions, and giving rise to the changes characteristic of it. The state of the blood has not been sufficiently attended to in the history of the cases which have been put upon record. In several of those that occurred in Germany, the blood taken at an early period of the disease, appeared to be cupped or buffed; but it afterwards seemed deficient as to crasis, or partially dissolved, and very dark. In the variety of farcy, the absorbents, as well as the glands, appear to be much affected, probably owing to the passage of morbid matter along them; but there is much yet to learn as to the history of the disease, and the lesions which it occasions, and still more, as to its treatment.

13. v. *The Prognosis* of the acute varieties of glanders is extremely unfavourable; all the cases observed in the human subject having terminated fatally. The chronic states of the malady seem not much less dangerous. Two or three, however, of these which have been recorded, appear to have recovered. In one of those mentioned by Mr. TRAVERS, the patient was cured by means, one of the principal effects of which was to produce frequent vomiting. Dr. ELLIOTSON remarks, in his last paper on this disease, that its occurrence in the human subject is by no means of extreme rarity; and that, since the publication of his former paper, upwards of a dozen cases had been mentioned to him by medical men.

14. II. *TREATMENT.* — Our knowledge of the treatment of this malady has not been much advanced by the experience we have hitherto had

of it in the human subject. The *prophylactic means* are, however, made sufficiently evident by the recognition of its *cause*. There can be no doubt that it is communicated to man only by contact of the morbid matter proceeding from another person or animal suffering from it; and it would appear that the infection is most certainly produced by this matter being brought in contact with an abraded or punctured surface. Whether or not it is capable of producing the disease by being applied to the unabraded mucous surface, or by merely contaminating the air breathed by the unaffected, is certainly not proved as respects the human subject, although there are a few facts which seem to favour the affirmative conclusion. As regards, however, the horse and ass, there can be no doubt of the frequency of this mode of infection; and, indeed, of the possibility of the disease being generated *de novo*, when circumstances such as those already alluded to (§ 3.) contaminate the atmosphere, in which a large number of those animals are confined.

15. The *method of cure* is not so evident as the means of prevention. It may, nevertheless, be directed with the following *intentions*:—1st. To arrest the progress, or change the character, of the local affection;—2d. To moderate or modify the constitutional disturbance accompanying it;—and, 3d. To counteract the contamination of the fluids and soft solids taking place in its progress, and to support the powers of life. These indications require means for their fulfilment, possessed of energy proportionate to the violence of the disease; and whilst the local symptoms are attacked, the constitutional powers should be assisted in opposing their extension. With these views, the more volatile stimulating antiseptics, or warm aqueous vapour conveying their fumes, may be inhaled, or diffused in the patient's apartment. Solutions of the chlorides may be sprinkled around; or pyroligneous acid, with kréosote and camphor, or spirits of turpentine, may be scattered over the bedclothes, or put into an inhaler with warm water, and the fumes inspired. Any of the terebinthines may be similarly used; and solutions of either of these, or of the chlorides, may be frequently injected, or employed as gargles. The chlorate of potash, or LABARRAQUE'S antiseptic solution, may also be tried internally; and stimulating diaphoretics prescribed, early in the disease. The vapour bath, with the fumes of camphor diffused in it; the warm bath, containing a sulphuret, or consisting of water in which aromatic or stimulating herbs are infused; the nitro-muriatic acid, or chlorine baths, &c.; are severally deserving of trial. Terebinthinate embrocations, as warm as they can be endured, may also be applied externally; or turpentine may be given internally, in small and often-repeated doses, with aromatics, &c. The various means detailed in the article FEVER (§ 556. *et seq.*), with reference to the treatment of the typhoid varieties, may likewise be resorted to.

16. Dr. ELLIOTSON mentions (*Med. Gazette*, vol. vii. p. 655.) that the veterinary surgeon of the 13th light dragoons treated this disease in the horse by putting a quantity of scalded bran, mixed with Venice turpentine, into a horse-hair bag, and tying it over the horse's head; the whole body of the animal being wrapped at the same time in a large blanket wrung out of boil-

ing water, and covered with several horse-cloths. This treatment procured a profuse sweat, and a free discharge from the frontal sinuses and nostrils, and promoted the healing of the ulcerations. Dr. ELLIOTSON also states, in his last paper on this disease, that the sedulous injection of a solution of kréosote up the nostrils removed the whole of the symptoms, in a case of *chronic glanders* in the human subject, after a very few weeks.—Mr. STORRY (*Veterinarian*, vol. vii. p. 145.) adduces cases, in which fumigation with carbonic acid gas appeared beneficial in glanders occurring in the horse; but other means, as calomel, aloes, &c., were also employed.

17. In the *chronic*, as well as in the *acute states* of the malady, *tonics* or *stimulants* conjoined with *purgatives*, particularly cinchona, or the sulphate of quinine, capsicum, and camphor, with aloes, &c.; *antiseptics*, as the chlorides, hydrochloric acid, or chloric ether, kréosote, and pyroligneous acid; warm *alterative diaphoretics*, especially guaiacum, mezereon, senega, sassafras, sarsaparilla, variously combined; the terebinthines, balsams, &c., and fumigating or medicated warm baths; may severally be prescribed and varied, appropriately to the characters of the case. The excessive thirst always attending the disease will be most beneficially quenched by a liberal use of soda water, spruce or ginger beer, Seltzer water, &c., which may be rendered still more cooling by the addition of small quantities of nitre, or of the subcarbonates of the alkalies; or they may be made the vehicles of several internal medicines.

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GLOSSITES. See TONGUE—*Inflammation of*.
GOUT.—SYN. Ἀρθριτις (ἀπὸ τοῦ αρθρου); αρθριτικὴ νόσος, Hippocrates, Aretæus. Arthritis, *Auct. var.* Ποδάγρα, Hippoc. et Aret. Ποδάγρα (τὰν ποδῶν ἄγρα, Lucian). Podagra, *Auct. var.* Ποδάγια, Gr. Morbus Articularis, Pliny. Chiragra; Arthritis Podagra; Morbus Dominorum; Gutta, Radulphus, Bartholin, &c. Febris Podagrica, Vogel. Podagra Arthritis, Parr. Arthrodynia podagrica, Swediaur. Cauma podagricum, Young. Arthrosia podagra, Good. Goutte Arthrite, Fr. Gliedersucht, gichtschmerzen, Fussgicht, Germ. Gotta, Ital. Gota, Span.

CLASSIF.—1. Class, Febrile Diseases; 2.
D

Order, Inflammations (Cullen). 3. Class, Sanguineous Diseases; 2. Order, Inflammations (Good). III. CLASS, IV. ORDER (Author, in Preface).

1. DEFIN.—*Constitutional disorder, giving rise to a specific form of inflammation; often favoured by original or hereditary constitution; appearing after puberty, chiefly in the male sex; returning after intervals; generally preceded by, or alternating with, disorder of the digestive or other internal organs; and characterised by affection of the first joint of the great toe, by nocturnal exacerbations and morning remissions, and by vascular plethora; various joints or parts becoming affected after repeated attacks, without passing into suppuration.*

2. I. Gout is one of the diseases, the nature and treatment of which were best known to the ancients.—In modern times, however, the morbid relations and associations of the disease, and its various modifications have been more fully elucidated; and its treatment assigned accordingly with greater precision. But attempts at distinguishing its various manifestations, locally and constitutionally, and with relation to the numerous disorders arising in the gouty diathesis, have induced modern writers to make so many divisions of it, and to arrange its forms and states so differently, as to render its study somewhat perplexing to the inexperienced. This is one of the greatest objections that can be urged to the works of MUSGRAVE, GUILBERT, and some others. The arrangements adopted by some of the best writers on the disease are, however, very similar; and I will not materially depart from them. Those of CULLEN and GOOD nearly agree, and that of Sir C. SCUDAMORE and of Dr. MACKINTOSH is quite the same. Differing, therefore, but little from these writers, I shall consider—1st, *Acute gout*;—2dly, *Chronic gout*;—and, 3dly, *Irregular gout*.—The forms described by authors, under the appellations of *regular, acute, inflammatory, chronic, irregular, nervous, atonic, lurking atonic, primary asthenic, primary fixed, anomalous, wandering, internal, visceral, retrocedent, misplaced, latent, masked, emphysematous, flatulent, disguised, aberrant, &c.*, will be appropriately considered under one or other of the above heads.

3. i. HISTORY OF ACUTE GOUT.—A. *Of the Symptoms premonitory of the Paroxysm.*—Although the gouty paroxysm may attack suddenly a person apparently in good health, especially on the first occasion of its appearance, it is more frequently preceded by symptoms of disorder referrible chiefly to the digestive organs. I believe that, if the cases in which it is said to have appeared suddenly were investigated, it would be ascertained, that more or less disorder had existed for some days before the seizure, although not so as to have excited any concern in the mind of the patient. The most common symptoms of premonition are—flatulence, oppression after a meal, irregular appetite; heartburn, with acidity of stomach, sometimes with acid or acrid eructations; costiveness, irregularity, or, more rarely, an irritable state of the bowels; scanty, deep-coloured urine, becoming turbid or thick on cooling, or sometimes copious or pale urine; a sense of soreness, or occasionally of coldness, at the epigastric region; itching, or irritation of the skin; drowsiness, or frequent yawning, restless or un-

refreshing sleep, more rarely nightmare; general lassitude and depression of spirits. In some persons, the symptoms of gastro-intestinal irritation are still more manifest, the tongue being loaded, red at its point and edges, the epigastrium tender, and the stomach oppressed after a meal. In many cases, increase of corpulency; scanty, thick urine; drowsiness, especially after eating, and a sense of general fulness and oppression, have preceded the paroxysm for a longer or shorter time, accompanied by several of the preceding symptoms. The appetite is frequently craving; and when indulged, is often followed by nausea, or vomiting of acrid matter, or by heartburn, flatulency, acrid eructations, &c. The premonitory symptoms vary in different persons, and depend much upon idiosyncrasy. Dr. MACKINTOSH justly remarks, that persons subject to gout are warned of a fit by some sensation or symptom peculiar to themselves individually: one feeling heat, pain, and dryness of the eyes; another, heat, redness, and swelling of the nose; a third, an unusual craving for some particular kind of food, or some peculiar feeling at the stomach, &c. Palpitations or internal flutterings; severe cough, with mucous expectoration; irritability of the bladder, the urine being loaded with mucus; a discharge from the urethra, with scalding, or difficulty in passing the water; unusual lassitude, and inaptitude for mental exertion; peevishness, irritability of temper; depression of spirits, more rarely an unusual hilarity; and various other symptoms, severally precede the paroxysm in different cases.

4. With more or less of these indications of constitutional disorder, the patient often experiences chills or rigors, followed by heat, flushings, headach, and the sensations referrible to the part about to be chiefly affected. These sensations, however, may have already appeared; but they are now more evident, and are increased during the night. The patient complains of weakness, tenderness, achings, numbness, prickings, or shooting pains, with spasms or a tingling sensation, in the limb; or of stiffness and weakness of the joints. A dark hue of the skin; fulness of the veins; swellings of the feet after exercise; disappearance of an accustomed moisture from the soles, with remarkable dryness and heat; and frequent change of position of the legs and feet, especially in bed, with general restlessness; are amongst the more constant precursors of the fit. One or both feet, particularly the soles, and the balls of the great toes, become burning hot: sometimes, however, they are cold, and are kept warm with difficulty; frequently the chilliness and coldness of the extremities alternate with feverishness, flushings, flying pains, and vertigo. Some of these symptoms, particularly the twitchings or cramps in the limbs, are felt chiefly when about to fall asleep, and are attended or followed by restlessness or watchfulness. Local signs of premonition are most common in persons who have experienced previous attacks. Where concretions have formed, severe pricking pains, with increased tenderness, are generally present. In those of an inflammatory diathesis, or who are plethoric, exposure to cold, or other exciting causes, may induce internal disease, with all the characters of idiopathic inflammation, which may continue for a longer or shorter time, and suddenly subside, being quickly followed by a regular paroxysm of gout; such instances,

however, belong to a form of the disease hereafter to be noticed.

5. *B. History of the regular Gouty Paroxysm.*—*a.* The first fit of gout, although commonly preceded by more or less of the above symptoms, sometimes occurs while the patient is in apparent health; but, even in this case, there have been indications of an inflammatory diathesis, or of vascular plethora, with slight disorder of the digestive organs. Most frequently he is suddenly awakened about midnight, or at one, two, or three in the morning, with severe throbbing pain in the affected part—commonly the ball of the great toe of one foot, attended by heat, stiffness, and a sense of distension and weight. These sensations increase to burning, with an actual augmentation of the temperature of the part, and with occasional severe stounding, or darting, pains up the limb. Restlessness, watchfulness, and fever increase, or continue, till about six or seven in the morning; when a gentle perspiration breaks out, followed by abatement of the symptoms, and some sleep in the slighter cases. The integuments of the part affected are swollen, slightly red, sometimes shining as if varnished; and the veins proceeding from it are remarkably full. In severe cases, but slight remission of the symptoms occurs for two or three days. More commonly, however, the symptoms abate in the day, but return, often with increased violence, at night, or shortly before midnight, and last till about five or six in the morning; the integuments have now become of a vivid or scarlet red, and admit of slight pitting on pressure. The pain is shooting, throbbing, intense, and gnawing, with an unpleasant sense of heat, burning, or weight. The least compression or touch of the joints cannot be endured.

6. *b.* The constitutional symptoms of the paroxysm vary with the severity of the attack, and the previous health of the patient. Fever is generally present, and commences as stated above. It is attended by restlessness, thirst, loss of appetite, oppression at the præcordia, flatulent distension of the stomach, with abdominal pain, costive or irregular bowels, morbid evacuations, and scanty high-coloured urine, depositing a pink or brick-dust sediment after standing, and sometimes containing mucus. The pulse varies, but is generally full or hard, and quicker than natural. Pain, heat, and tenderness of the epigastrium, with spasmodic sensations referrible to the stomach, are frequently complained of, and are attended by sour eructations, or vomiting of acrid or acid matters, sometimes mixed with bile, and causing unpleasant irritation of the pharynx and fauces. The tongue is furred or loaded, the papillæ erect, and the edges and point red. The stools are offensive, mixed with mucus, sometimes pale or clayey, but more frequently foul, blackish, or of an olive green. The symptoms altogether evince more or less irritation of the gastro-intestinal mucous surface, with obstruction or vitiation of the biliary and intestinal secretions. In old cases, and in persons far advanced in life, the attendant fever is much less inflammatory, and sometimes partakes more or less of the nervous character. In most instances, the nervous system evinces disorder by irritability of temper, increased sensibility, restlessness, and darting pains in the course of the nerves, very generally attended by violent cramps, or spasmodic contraction of the muscles

of the affected limb, and sometimes followed by the sudden transition of the disease from one limb to the other. Almost any change of posture produces this spasmodic action, and the severe pain attending it. Sir C. SCUDAMORE states, that of 120 cases, cramps occurred in 90, with more or less severity, either upon the accession of the paroxysm, or during its height, or at its close, or even during all these periods.

7. *c.* A first attack may continue from two or three days to ten or twelve. The œdema remains a short time after the inflammation, which disappears with desquamation of the cuticle of the part, and much itching. Sometimes the disease appears in the other foot, giving rise to the same succession of disorder, often with greater severity and prolonged duration. Sir C. SCUDAMORE thinks that the first attack is more frequently mild in men than in women; and states, that of 198 cases, the great toe of one foot only was affected in 130; the great toe of both feet in ten; the great toe and instep in three; the instep of one foot in five; the instep of both feet in three; one ankle in ten; both ankles in one; the ankle and instep of one foot in four; the right knee and left hand in one; the back of one hand in two; and the wrist in one; various parts of the lower extremities, especially of the feet, being affected in the rest. He further remarks, that, in hereditary gout, the great toe is mostly the part first affected; and that the exceptions to this seat of a first attack, are chiefly met with in persons who have acquired the disease.

8. *d.* The frequency of the returns of the fit depends upon the constitutional tendency, the treatment, and the regimen, and mode of life of the patient. Although the disease generally returns to the part previously affected, the other foot seldom escapes. Each succeeding seizure is usually more severe and of longer duration than its antecedent, and the attendant constitutional affection more serious. Exceptions, however, to this may occur when the disease has been treated with judgment, and the patient has been careful of his health. The intervals also become shorter, and the parts affected more numerous; but the fits are most apt to recur early in the spring, or late in autumn, probably owing to the variability of the weather at these seasons; but they may occur at any season. The malady generally acquires strength with each returning fit, both as to the number of parts affected, and as to the duration and degree of suffering caused by it; the susceptibility to it increasing both locally and constitutionally, with the repetition of the attacks.

9. *e.* In some persons, the gout seizes only the feet; but, in more numerous instances, in its progress, several parts are attacked in the same paroxysm; the gouty inflammation affecting different places in succession, or at the same time, with equal or various degrees of severity. The feet, ankles, knees, and elbows are occasionally thus successively or simultaneously attacked; together with the ligaments, the bursæ mucosæ, sheaths of tendons or aponeuroses. In the older cases, even the shoulders and hips are sometimes affected. The disease often suddenly leaves one part, and as instantly appears in another; but it occasionally commences in one situation before it departs altogether from the other. This rapid transfer of the morbid action

from one part to another, either of the same or of a different limb, is one of the most characteristic phenomena of gout. When it thus passes to the opposite limb or extremity, some indications of the disease have often existed previously in that part. In a few instances, the chief suffering of the patient is in the day; in others, both day and night are passed in equal pain: but in most cases, particularly in the more recent attacks, the night is the period of greatest distress.—The redness and oedematous swelling are most remarkable in the foot, hand, and elbow. In the ankle, knee, wrist, &c., there is little redness, excepting in small patches, and the swelling is caused by effusion into the sheaths of tendons, and into the bursæ; the latter often being greatly distended, painful, and exquisitely tender. In the more severe cases, the veins of the limb are large and full, and unusually numerous near the affected part. The pain in gout is peculiar—is severe, burning, throbbing, shooting or stounding, and otherwise modified in different cases, as stabbing, cutting, boring, or gnawing.

10. *C. The Sequelæ of Acute Gout respect*—
1st. The effects of the disease in aggravating previous derangement, or inducing disorder of internal organs; and, 2d. The alterations produced by it in the part affected.—*a.* Severe attacks of gout impair vital power in the digestive, biliary, and nervous organs; or they may be said, with greater accuracy, to weaken still more the previously debilitated organic nervous influence. Hence occasionally result a numerous train of dyspeptic symptoms; hypochondriasis and torpid or otherwise deranged function of the liver; inaction of the cæcum and colon, causing a sluggish state of the bowels and morbid evacuations; increased liability to apoplectic and paralytic seizures, or to cramps, wandering pains, &c. SYDENHAM supposed that gout disposed to the formation of urinary calculi; and numerous cases have been recorded in which either they or gravel in the urine alternated with the gouty paroxysm. This connection has received support from the observations of MORGAGNI, SCHURIG, BUECHNER, SHROEDER, MURSIGNA, HEIM, and FORBES; but Sir C. SCUDAMORE states, that irritation of the urinary organs and gravel occur rather before and during the paroxysm, than in the interval; and that calculus of the bladder is a very infrequent complaint amongst gouty persons; of 231 of whom, five only were so afflicted. This, however, does not altogether disprove the connection; as renal calculi may have existed in some, if not in many of these. He, however, adds, that the urine of gouty persons deposits, without any exception, at some period or other, either gravel or the pink or brick-dust sediment. There can be no doubt that the gravel is formed either in the kidneys, or in the urinary bladder; and if this be granted, a strong argument will be thereby furnished in favour of the occasional supervention of calculi.

11. *b.* The most frequent consequence of acute gout, as respects the local affection, is the passage of it into the chronic form; but before this degeneration may have taken place, several lesions of the tissues composing the part affected may be produced by acute attacks. These are—weakness, stiffness, and lameness of the joint, with a snapping or grating sensation upon motion, owing to imperfect secretion of the synovial fluid. The

ligaments and muscular aponeurosis become thickened, stiff or inelastic, and tender. The secretion from the sheaths of the tendons is thickened or otherwise vitiated, causing a knotty and thickened feel upon examination, sometimes with contraction and rigidity. The bursæ mucosæ are enlarged, and either distended, or soft and yielding to the touch. The contents of the small bursæ are sometimes inspissated so as to form hard tumours; and the deep-seated textures of the joints become thickened and apparently consolidated. The veins of the feet and legs are often either enlarged or varicose; but these, as well as various other changes, as concretions, &c., are chiefly the result of the chronic disease.

12. *ii. CHRONIC GOUT.*—*a.* This state of the disease is characterised by the inflammation and pain being more slight, irregular, and wandering, than in the acute; by the faint redness of surface, the permanent distension and oedema of the part; by impaired power of motion; by its more continued duration, and association with disorder of the digestive organs; by the languid or oppressed circulation; and by general irritation of the nervous system. It is generally a consequence of one or more acute attacks, either when the paroxysm has not passed off with a regular crisis or evacuation, or when repeated seizures have so enfeebled the constitution as to render it incapable of manifesting sthenic action. It may, however, appear primarily, constituting the *Primary Chronic Gout* of J. P. FRANK. In this case, instead of severe paroxysms occurring at distant intervals, the seizures are much milder, but much more frequent, prolonged, and irregular. Primary chronic gout is more common among women than men—and in them, especially, seldom affects the great toe; sudden swelling, and pain, with but little of the appearance of the gouty inflammation, affecting chiefly the instep or ankle, or the wrist or hand. When chronic follows acute gout, the various parts which had been inflamed in the paroxysm of the latter, continue affected, either alternately or in conjunction; but the pains are more wandering, and have now and then a rheumatic or nervous character.

13. *b.* Whether primary or consecutive, *chronic gout* presents the following *local symptoms*.—A sense of alternate heat and coldness is felt in the affected part, and is much increased at night. There are often numbness and an uneasy sense of fulness and weight. The muscles and joints feel weak, and cramps of the lower limbs occur chiefly at night, when falling asleep. Startings and restlessness are generally also complained of. The surface of the part is either of a pale reddish colour, or of the natural hue, or of a purplish tint, the discoloration being sometimes transient. The parts are tender; shooting pains pass along the nerves; motion is difficult and painful; and the energy of the limb very much impaired. The bursæ and the sheaths of tendons are more frequently affected in the chronic than in the acute gout, occasioning puffiness and distension. Oedema is generally present and permanent, attended by fulness of the veins. Even in the slightest cases, aching and a sense of heat are felt in the ankles after walking.

14. *c.* The *constitutional symptoms* are remarkably diversified by the temperament and habits of the patients, the situation and degree of the

local disease, and by the nature and extent of the internal associated disorder. Numerous dyspeptic symptoms and uneasy sensations referrible to the stomach,—as craving for food, nausea, oppression after a meal, flatulency, heartburn, a sense of coldness at the stomach, transient pains, or spasms of the muscles of the abdomen or chest; a costive or irregular state of the bowels, with morbid or offensive stools; a deficient or unhealthy biliary secretion; and hæmorrhoids, with evacuations of blood; are often present. Feverishness or irritation follow too full a diet, or stimulating food; and a sallow or slightly yellow cast of countenance, with uneasiness or pain in the hypochondria, and deficiency of bile, are not infrequent. The urine is various, being sometimes scanty, high-coloured, or thick, or occasionally abundant and dilute: it generally deposits a pink or lateritious sediment. Palpitations and flutterings of the heart are very common, particularly when there is much flatulence. Sleep is broken, disturbed by unpleasant dreams, and unrefreshing; the temper is irritable, and the mind hypochondriacal, imaginary or trifling ills occupying the attention. In some cases, a chronic dyspeptic cough, or an increased secretion of mucus in the trachea, is complained of. Many persons, especially females, are exquisitely sensitive, and have their ailments increased by vicissitudes of atmosphere, especially by cold and humidity. In prolonged or severe cases, the system often becomes cachectic; the limbs weak, stiff, and wasted; and the abdomen large. Although the patient's appetite may be natural, yet he is neither nourished nor strengthened by his food, which may even increase both the constitutional and local affection.

15. *d.* The concomitants or consequences of prolonged chronic gout are, thickening and consolidation of the tissues of the affected part. The veins of the limb often become varicose, and increase the achings and fulness of the part, or cause purplish blotches of the surface, and, although rarely, ulceration of the skin. — *Gouty concretions* occur only in a few cases, and arise from the effusion of a whitish fluid, the watery portion being absorbed. Mr. MOORE remarks, that this effusion occurs not only during the fits, but also in the intervals; that it is not enclosed in a cyst, but usually lies in the cellular membrane, in the bursæ mucosæ, or in the cavities of joints. In the sheaths of tendons, these concretions are generally hard or stony; in the bursæ, they are likewise hard; and in the cellular tissue, their consistence varies. They may also form between the cuticle and cutis; where they vary in consistence, or even occasion intractable deep ulcers, as in a case related by Mr. HERBERT BARKER. When they are situated within the capsular ligaments, the cartilage is absorbed, and one or more phalanges distorted. Sir C. SCUDAMORE mentions several such cases. When the concretions cause ulcerations, the chalk-like matter is constantly secreted in a fluid or semifluid state, and accumulates in the bottom of the ulcers.* The surrounding

surface is usually of a red colour, shining, and the seat of severe burning pain — symptoms occurring in paroxysms, with remissions or intervals of various duration. In such cases, erythema or erysipelas may be associated with the local affection. Although the concretions generally appear in the joints and surrounding tissues, they may occur in other situations, either simultaneously, or otherwise. MORGAGNI mentions their formation in the breast of a patient suffering from hereditary gout. In the case detailed by Mr. BARKER, there was a gouty concretion of the size of a horse-bean deposited on the left side of the nose. Dr. ELLIOTSON met with a case in which they formed in the ears. Their chemical constituents seem to be lithic acid combined with soda, potash, or ammonia, but mostly with soda, and with a little animal matter. They are of a light, or whitish grey colour; insoluble in cold, and partially soluble in boiling water.

16. *iii.* Irregular Gout. — Under this head may be arranged the various states of disorder, either occurring in the gouty diathesis, or connected with the appearance of the gouty paroxysm, or following its sudden cessation in an external part. In this extended acceptance of the term, *irregular gout* will comprise the brief consideration of those derangements to which the names *anomalous, imperfect, internal, visceral, misplaced, displaced, retrocedent, transferred, metastatic, wandering, flying, disguised, masked, &c.* have been applied. I shall, therefore, consider — 1st. Those specific or anomalous disorders appearing in the gouty diathesis, and followed by a complete or imperfect external gouty affection; — 2dly. The derangements consequent upon the sudden cessation of the gouty paroxysm; — and, 3dly. The various anomalous or disguised affections afflicting persons of the gouty diathesis, without being followed or attended by any manifestation of external disease. It has been urged by some modern authors, and even by the latest writer on gout, Dr. BARLOW, that several of the forms just alluded to are merely internal disorders occurring in gouty persons, and differing, in their nature and treatment, in no respect from those usually observed; or, in other words, that these internal affections possess no specific gouty character. This is true in one point of view only, but not in others; for it must be admitted that the gouty are even more liable to internal diseases than healthy persons, and that these diseases will often pursue the usual course in the former as well as in the latter. That the gouty are very liable to nervous and functional disorders, especially those implicating the digestive and excreting functions, and that those disorders often present nothing peculiar, are generally admitted; but that many of the affections which either precede or follow the external manifestation of gout, or that appear in the gouty diathesis, differ very materially from those observed in other persons, is shown by the following circumstances: — 1st. Gouty inflammations of the eye are very different in their visible characters, their seats, and their consequences, from common ophthalmia; and every one possessed of due powers of discrimination, will

* “An officer of temperate habits, who had undergone much active service, was, for some years before his death, ætat. 45, much affected with gout: many balls of chalk were removed from his hands, and he could write on the table with the point of his finger. Ulcers had also formed

on his feet, which usually discharged an ounce of fluid chalk in the 24 hours.” (*Catal. of Prepar. &c. in the Museum of Fort Pitt, &c.* p. 167.)

admit that they require a different mode of treatment. 2dly. The knowledge we possess, however imperfect it may be, as to the changes and appearances consequent upon fatal internal disease in gouty persons, is conclusive of a material difference between them and those following more common maladies; and, 3dly. The *juvantia* and *lædientia* in the former are often very different from those in the latter.

17. *A. Specific or anomalous affections often precede the external manifestation in a complete or imperfect form of acute or chronic gout.* They may be either in every respect similar to other affections of the same seat, or very different and peculiar. In the former case, the external appearance of gout seems critical, and has been viewed as such by many writers; in the latter, it appears as the external manifestation of a constitutional disorder previously implicating the functions or sensibility of one or more internal organs. — In perusing the older writers, numerous instances present themselves of gout supervening upon, and appearing critical in, inflammatory and severe internal complaints. MORGAGNI considered himself cured of an ophthalmia that had resisted treatment, by an attack of gout. Dr. BAILLIE mentions a case of palpitation of the heart disappearing upon the occurrence of the gouty paroxysm; but these are not rare occurrences. Indeed, palpitations of the heart are frequently symptomatic of the disorder of the digestive organs ushering in the seizure. Affections of the urinary organs, erysipelas, asthma, and other diseases, have likewise been removed by a regular fit of gout. One of the most interesting illustrations of the succession and critical influence of gout upon dangerous internal disease, occurred to a medical gentleman whom I attended in 1824. He was seized in the evening with symptoms of complete congestive apoplexy, for which he was bled and purged, but without restoration of his consciousness. On the following morning, gout suddenly appeared for the first time, with great intensity in the ball of the great toe of the right foot, and instantly removed all the apoplectic symptoms, the mental functions being perfectly clear and undisturbed on my seeing him very shortly afterwards. When gout assumes a regular character, such antecedent affections appear merely as unusual precursors of the paroxysm, ushering in either the first seizure, or an attack in persons who had been previously affected by it.

18. *B. Retrocedent or displaced Gout — recedent, or transferred, or metastatic Gout — Podagra retrocedens — P. retrograda, CULLEN — P. complicata, GOOD. — a.* During the gouty paroxysm in either its acute or chronic form, it sometimes happens that an internal organ becomes suddenly and dangerously affected, the external disease being either much mitigated, or having entirely disappeared. It has been disputed whether the internal disorder arises from the suppression or subsidence of the external affection, or whether the latter disappears in consequence of the occurrence of the former. Either may take place, as evinced by the succession of morbid phenomena, in different cases: the development of disorder in an internal organ, deriving it from external parts in some instances; and the suppression of the external manifestation of a con-

stitutional disease, determining it to an internal predisposed viscus in others. When retrocession occurs in the height of an acute paroxysm, the superinduced malady is generally also acute, and rapid in its course; but when it takes place in the chronic form, it is often less severe and more prolonged. The internal affections, which thus arise, are generally caused by the patient's imprudence, by his habit of body and temperament, by previous disorder, or by injudicious treatment and management. The stomach is most liable to be affected, severe pain and spasm, with sickness, being complained of. The intestines may be also attacked, either alone or in conjunction with the stomach, with all the symptoms of acute inflammation; either form of disease often pursuing a violent or rapidly fatal course. Severe pain in the head, and symptoms of inflammation of the brain and its membranes, stupor, coma, apoplexy, epilepsy, or palsy, supervene in some cases, especially in those who have previously evinced a tendency to these maladies. In other instances, affections of the chest appear; particularly dyspnoea, sense of suffocation, oppression at the præcordia, with or without cough or expectoration. In some, pain or constriction in the region of the heart, violent palpitations, oppressed breathing, urgent anxiety, syncope, or leipothymia, &c. occur, indicating a serious affection of the heart or pericardium. In a case of this description recorded by Mr. BROWN, and which terminated fatally some months after the disappearance of gout, the pericardium was thickened, and containing six ounces of bloody serum; the heart was greatly enlarged, and its substance was pale, soft, flaccid and attenuated, its internal membrane being of a deep violet colour; honeycombed ulcers were also observed at the root, and in the arch of the aorta. Other diseases of an inflammatory, spasmodic, or nervous character, or of these mixed, may follow the disappearance of the external gouty affection, more particularly dysentery, hepatitis, peritonitis, and various affections of the urinary or uterine organs. Dr. CULLEN mentions strangury, catarrhus vesicæ, and hæmorrhoidal affections, amongst those not infrequently alternating with gout; and instances have occurred to myself, as well as to Sir C. SCUDAMORE, Mr. HOWSHIP, and many others, of the transference of the morbid action to the kidneys, causing suppression of urine, or inflammation with partial suppression; or to the neck of the bladder with severe spasm, or even to the prostate gland. Mr. HOWSHIP mentions, that when gout is transferred to the kidneys, the urine becomes albuminous, as well as scanty. Dr. HOME states, that a gentleman, who exposed himself to cold and wet, whilst affected by gout in the feet, was in a few hours afterwards affected by enteritis, which proved fatal in twelve hours; and Sir C. SCUDAMORE mentions, that Dr. PARRY met with two instances of extravasation in the brain in the same winter, after repelling gout from the extremities by immersing them in cold water.

19. *b.* The information we possess as to the lesions produced by the transference of the morbid action to an internal part, is extremely imperfect; many who have the opportunity, not giving themselves the trouble to inquire respecting them, or supposing that little or no alteration may be expected in such cases. Others, again, believe that

the changes consist chiefly of those produced by inflammatory action. Without disputing that the consecutive affection is frequently inflammatory, I have seen it, in several instances, possessed of a distinctly nervous and spasmodic character, or consisting chiefly of remarkable depression of power, with the abolition of the function of the organ principally affected, and most intense suffering. A medical friend, some years ago, whom I attended in the disease, took, contrary to my wish, and previously to removing biliary accumulations and morbid excretions, a large dose of colchicum; and was very shortly afterwards seized with violent pain in the stomach, a sense of sinking, and languid small pulse, the gout having instantly disappeared from the foot. I soon afterwards found him in the utmost agony, and prescribed large doses of camphor, with other diffusible stimuli, and mustard cataplasms to the feet. The gout as instantly returned to the extremities, and the affection of the stomach disappeared. A medical man, lately resident in Crawford Street, experienced; in 1830, an imperfect attack of gout in the feet. When I saw him, it had just forsaken this situation, and in twenty-four hours it successively had attacked the bowels, in the form of most violent colic, the diaphragm, and lungs, causing the most urgent dyspnoea; and lastly, the head, in a slight degree. The disease then appeared in one foot, and afterwards transferred itself to the other. In these cases, the phenomena of internal disorder were those of severe nervous affection, probably also connected with congestion, or irregular determination of blood; and the treatment founded on these views procured relief in them all.

20. Formerly, the internal affections thus connected with the disappearance of gout, were too exclusively viewed as nervous, and treated as such, notwithstanding the indications of inflammatory action sometimes attending them. More recently, and even at the present day, a very opposite opinion has been promulgated. Dr. GREGORY, of Edinburgh, supported this latter opinion, and was followed in it by Dr. BATEMAN and Dr. BARLOW. Fully admitting the inflammatory character of these consecutive affections in some cases, I must strenuously contend that it does not constitute the principal feature of them in others. In several instances, three of which occurred in medical men in this city, an inflammatory state could not be inferred either from the sensations of the patients, or from any symptom that I observed; and as the treatment founded upon the gouty and nervous characters of the disease was successful, there is no reason to infer that a latent inflammation had existed in these cases. That inflammatory and congestive affections of various internal viscera often occur, in such circumstances, cannot be disputed; but the practitioner should be prepared to meet also with very different and often anomalous disorders — to find some attended by the most intense suffering and distress; others by a feeling of sinking or dissolution; others by distressing anxiety, terror, and irritation; others by spasmodic action and morbid sensibility; and, lastly, others by constant pain, internal heat, distension, tenderness, and other indications of inflammatory action. In some, the pulse is weak, irregular, fluttering, small, or intermittent; in others, excited, fre-

quent, irritable, but regular; or full, strong, and energetic. I have even seen it all these in succession, in the same retrocedent affection, and within a few hours. Some cases, even where the same organ is implicated, are attended by constant pain, a sense of increased heat, or of burning, remarkable tenderness, and excited pulse; and others, by remarkable depression, great languor, a sense of coldness or of weight, or oppression, a weak and languid pulse, and a feeling of vital exhaustion and of impending dissolution. Of the pathological relations of these different morbid conditions, more particular notice will be taken hereafter (§ 40—42.).

21. *C. Disguised or lurking Gout — anomalous, imperfect, internal, visceral, nervous, masked, or misplaced Gout — Podagra atonica, CULLEN — Podagra larvata, GOOD.* — The gouty diathesis may be generated in a constitution too weak to develop the local affection in the extremities. When this is the case, various disorders affecting internal organs, most frequently those of digestion and excretion, arise, and often assume anomalous or Protean forms, with functional or nervous characters, and even congestive or inflammatory states, as in retrocedent gout. In that variety, the internal disease is preceded by, and is rapidly consecutive of, the disappearance of an external gouty affection; but this variety is frequently unattended by any such affection, however slight or fugitive, although it may occur. It has been too generally inculcated, that the disorders appearing in the gouty diathesis have nothing peculiar in their character, or different from those observed in other circumstances. This subject has been already sufficiently adverted to, with reference to retrocedent gout; and the observations there made are equally applicable to those affections which appear in the lurking or disguised manner now being considered. When, in connection with the generation of the gouty diathesis, the constitutional powers have been greatly impaired, and the functions of excretion weakened, numerous internal disorders result, whether the patient may have experienced a fully formed fit of this disease or not. A fastidious or impaired appetite; a sense of distension and flatulence; acid or acrid eructations, or nausea or vomiting; spasmodic constriction, or most painful oppression at the epigastrium; costiveness and violent colic; mental depression, anxiety, or hypochondriasis; palpitations, or other irregularities of the heart's action; hemicrania, vertigo, and various affections referred to the head, or even palsy, epilepsy, or apoplexy; nervous excitement and irritability, with a sense of depression, and several other affections; sometimes present themselves, either with or without slight manifestations of gout in one or other of the external situations above enumerated. That those complaints are favoured by, and very often occur in, the gouty constitution, cannot be, and, indeed, is not, doubted. The question only is, whether these be of an inflammatory, or of a nervous, or of a mixed, or of a specific or peculiar character. That they are functional, chiefly, cannot be disputed; but that others of a more decidedly inflammatory or congestive kind may occur, as in cases of retrocedent gout, seems to be most consonant with the phenomena observed in different cases, and with the pathology of the disease, according to the view of it hereafter to be exhibited. Dr. HAYCARTH

has recorded two most interesting instances of misplaced gout, causing arthritic carditis in the one case, and enteritis in the other; and, although an attack of gout had not been experienced for many years, moderate depletions, and sinapisms applied to the extremities, were followed by the external gouty disease.

22. It is not unusual to hear persons who are advanced in life, and who have ceased to have their usual attacks of gout, complain of various nervous or functional disorders of so remarkable and peculiar a kind, as to convince them that gout is affecting or wandering through the system without developing its usual effects. Sir C. SCUDAMORE very justly observes, that some gouty persons are affected with severe colic upon accidental exposure to wet and cold, or from acid or indigestible articles of diet; and that almost invariably these attacks are spasmodic and not inflammatory; hot brandy and water, or compound spirit of ammonia, giving relief. It should, however, be recollected, that the continuance of pain may cause congestion of, or inflammatory determination to, the affected part. The internal complaints occurring in the gouty diathesis are generally attended by sensations so distressing, and often so peculiar, as to excite suspicions of their nature in the mind of the patient, and to cause him to desire an attack of gout, however severe, in the extremities, believing that it will remove the internal and more dangerous sufferings. Sir C. SCUDAMORE defines these affections "to be disordered functions of internal organs in a gouty constitution, and thereby modified in their character;" and in this opinion he has been followed by Dr. BARLOW and others. Dr. CULLEN, and those who preceded him, distinguished these complaints by the term "misplaced gout;" and, as it will appear in the sequel, the difference between the ideas intended to be conveyed by these terms, is more apparent than real; for the one, in admitting that such complaints are modified by the gouty diathesis, concedes all that is contended for by those who distinguish them by applying to them, without circumlocution, a term indicating at once their most important features and relations.

23. II. DIAGNOSIS.—A. *Acute Gout* may be mistaken for *acute rheumatism*, which it may approach more or less near, when the latter affects the joints; or for common inflammation of these parts.—It seldom happens that more than one part is affected, and still more rarely that more than one is attacked at the same moment, in the first fit of gout. This character, however, cannot be extended to acute rheumatism. In the former, there is much more disorder of the digestive organs precursory of the attack, than in the latter, and the remission from pain and fever, during the day, is much more distinct. In *gout*, serous effusion into the cellular tissue is early in the fit, and to the extent of admitting of slight pitting on pressure; the veins are turgid in the vicinity of the affected part; the pain is pungent, severe, burning, stounding, lancinating, or peculiar; the surface is inflamed, deeply red, shining as if varnished, turgid, and exquisitely tender; the temperature of the part is very much increased; and the urinary secretion is remarkably disordered, generally depositing a quantity of the pink or lateritious sediment, consisting of the lithate of soda, the tinging substance being the

purpurate of soda. These symptoms are either absent or slightly marked in acute rheumatism.

24. The hereditary character of gout; the frequency of it in the plethoric, sanguine, and irritable constitutions, and at an advanced age; the sudden incursions of the fit; and the commencement of it in the small joints; further serve to distinguish it from rheumatism. Although gout may affect the knees, shoulders, elbows, &c., after repeated attacks, or in its chronic form, it rarely commences in these situations; whereas rheumatism generally begins in the shoulders and larger joints.—It is sometimes, however, observed that the patient, on recovering from the one disease, may be attacked by the other, upon exposure to its exciting causes; and a person, who early in life has lived frugally and laboriously, and been subject to attacks of rheumatism, has, at a more advanced age, lived fully and indolently, and been attacked by gout. In either case, the patient himself has no difficulty in distinguishing between them; and the experienced practitioner will have as little, however much he may be at a loss to convey his ideas respecting their diagnosis to others. It is not so much by any one mark, as by the concurrence of several circumstances, connected with the causes, the constitutional disturbance, antecedent and existing, and with the local characters, that a correct diagnosis can be formed. *Common inflammation of the joints* cannot be mistaken for acute gout, if the character of the pain, the state of constitutional disorder, and the urinary secretion, receive attention. The continued or unremitting state of the symptoms, and the course, progress, and termination of the disease, will also serve to distinguish them.

25. B. *Chronic Gout* may be distinguished from *chronic rheumatism* by several of the circumstances already adverted to.—The former is much more frequently preceded by the acute disease, and by disorder of the digestive and excreting functions, and is very much oftener attended by swelling, thickening, or nodosity of the affected parts, than the latter. However, cases not infrequently occur, in which gout, in its more chronic form, very nearly resembles chronic rheumatism, there being but little disorder of the above functions attending them. In forming a diagnosis, the temperament, habit of body, age, and mode of living should be taken into consideration. Dr. HAYGARTH observed, that only 14 patients out of 300 ill of chronic rheumatism had swelling in the seat of disorder. It should, however, be recollected, that when chronic rheumatism affects the bursæ mucosæ, and thecæ of tendons, particularly those of the knee joint, considerable tumefaction takes place. Although the gout, in its chronic form, is still more fugitive than when acute, and thus approaches nearer to the nature of rheumatism, yet it is much more disposed to seize the hands and feet than that disease, as well as to be more solitary in its situation. The parts which have been often affected with gout become very susceptible of changes of temperature; and, in this respect, partake of the rheumatic character. Sir C. SCUDAMORE thinks that it is only in this way that any propriety can be attached to the expression *rheumatic gout*; and conceives that gouty and rheumatic inflammations cannot both exist in the same part at the same time, although they may occasionally co-exist in different parts; as when a

patient suffering gout in the usual situations is seized with rheumatism in the muscles of the neck, or in the shoulder, or other parts, in consequence of exposure to currents of cold air, &c. When gouty concretions form, the nature of the complaint will be sufficiently evident.

26. *C.* It is a matter of great difficulty to discriminate between the internal affections characterising *irregular gout*, and similar affections unconnected with this disease, as may be inferred from what has been already advanced on the subject. It is only by applying sound principles of pathology to the investigation, guided by much acumen and experience, that we can expect to distinguish between them. When called to a patient advanced in life, of the irritable and nervous temperament, complaining of violent sufferings, or of various nervous and functional disorders, or of severe spasmodic affection, we should endeavour to ascertain, from the state of the pulse and the temperature of the surface, from the sensations produced by a minute examination, from the appearances of the excretions, and from the history of the case, especially with reference to its causes, and to previous attacks of gout, and to any hereditary predisposition to it, the exact pathological condition upon which the symptoms depend. The existence or non-existence of inflammatory action, or the degree in which either may be mixed up with spasm, or morbid sensibility, should be ascertained. Many writers, both previous to, and contemporary with, Dr. CULLEN, considered debility and spasm, with altered sensibility, to be more characteristic of retrocedent and misplaced gout, than inflammatory action; and this opinion seems to have been too generally and often injuriously adopted. But I am convinced, that, in more recent times, the opposite doctrine has been too exclusively confided in, and with little less injury as to the results.—The practitioner, in all such cases, should be guided by pathological inferences derived from the phenomena characterising individual cases; and if he find the pain fixed, the pulse excited, or hard, or oppressed, the skin hot, and the parts tender or painful on pressure, he will deduce the existence of inflammatory action: whereas, if the pulse be weak, small, irregular, or indistinct, and compressible; if the skin be cool, the countenance collapsed or anxious; the surface relaxed and perspirable, the parts tolerant of pressure, and if no unnatural sound be detected on auscultation and percussion; he will infer the presence of functional disorder merely or chiefly, or of spasm, or of depression of nervous power with altered sensibility.

27. III. PROGNOSIS.—The prognosis should vary with the form which gout assumes.—*A.* In the *regular acute disease*, a favourable opinion may generally be given, if the internal organs betray no serious lesion of function or of structure. The subsidence of sympathetic fever; improvement in the excretions, the urine ceasing to deposit a sediment, or losing its high specific gravity; a return of the appetite, and of the spirits; desquamation of the inflamed cuticle, with disappearance of the swelling; are indications of recovery. The sudden transference of severe affection from one part to another, especially if accompanied with painful sympathy of the digestive organs, or with nervous symptoms and exquisite susceptibility, or

with irregular fever, and with persistent disorder of the excretions, are signs of a difficult and intractable disease. In this form of gout especially, the prognosis should be influenced chiefly by the state of the excretions; for as long as the stools and urine continue morbid, other signs of amendment will prove delusive.

28. *B.* The prognosis in *chronic gout* is more unfavourable than in the acute, as respects subsequent immunity from the disease. As to recovery from the seizure, the circumstances just stated will influence the opinion of the practitioner, as in the acute variety. In every case, however, the state of constitution and of internal organs, and the effects produced by treatment, should be taken into account, in deciding respecting the duration or the event of the disease.—*C.* *Internal affections* occurring either in the gouty diathesis, or upon the sudden disappearance of the external disorder, are always unfavourable in proportion to their severity, and the vital importance of the parts in which they are seated. When the heart, the brain, or the stomach and intestines, are the seats of *retrocedent* or *misplaced gout*, the patient should be always considered in the utmost danger; especially if he be far advanced in life, if nervous energy be much impaired, and if judicious treatment has not immediately produced the desired effect. Cases of this description, however, not infrequently recover when appropriate and decided means have been promptly resorted to, and when the constitution of the patient has not been remarkably injured.

29. IV. CAUSES OF GOUT.—*i.* *Predisposing Causes.*—These may, as in other diseases, become exciting causes, owing to continued or energetic action.—*a.* *Hereditary disposition* has always been viewed as most influential in the production of gout. CADOGAN, however, attached too little importance to it, and CULLEN too much. It is very probable that it will evince various grades of influence in different classes or states of society;—that it will seem of greater importance in those who live regularly, soberly, and laboriously; and of much less, in those who are indolent, luxurious, or dissipated. Sir C. SCUDAMORE states, that of 213 persons afflicted by gout, 84 could not trace it either to the father's or mother's side. But it is probable, conformably with what has been just stated, that an unusually large proportion of non-hereditary cases will be met with amongst the indolent and luxurious inhabitants of a large metropolis. Of the hereditary cases, 62 were derived from the father, 29 from the mother, 14 from both father and mother, 14 from the grandfather, &c. When both parents have had the disease, a greater number of the children will experience it. Where one parent only has had it, the child or children having the greatest resemblance to that parent will be most liable to it.

30. *b.* *Adult age*, particularly from 25 to 50, is the period at which gout most frequently first appears. Sir C. SCUDAMORE states, that of 209 cases, 25 had the first attack between 20 and 25 years of age; 38 between 25 and 30; 41 between 30 and 35; 37 from 35 to 40; 18 from 40 to 45; 25 from 45 to 50; and 11 between 50 and 55. Gout is rarely met with before puberty. HIPPOCRATES first stated this fact, and it has been confirmed by SYDENHAM and many other writers. HEBERDEN never saw an instance of it. Dr.

SCUDAMORE mentions a case at 8 years of age. I treated one, many years ago, at 11; and am at present attending a boy of 9, recovering from a severe attack in the foot. Very early seizures have generally been observed where the hereditary predisposition has been strong. In the two cases just alluded to, it existed in both parents; and, in one of them, there was great precocity of intellect. In some cases, where the disease appeared very soon after puberty, premature or excessive venereal indulgences seemed to me to have aided in its production.

31. *c.* The *male sex* is much more disposed to gout than the female.—HIPPOCRATES mentions the non-liability of females until the cessation of the menses. This, however, is not correct; for cases occur at an early age in the plethoric through indolence and high feeding, and in those who have not had children. I met with an instance of it in a female of 27 years of age, who was thus predisposed. Dr. GREGORY observed, in his Lectures, that females subject to gout had experienced menorrhagia, or had become plethoric from ingurgitation; and Dr. CULLEN has remarked, that robust and masculine females, before the menses have ceased, or those in whom they have been very abundant, are not infrequently attacked. The instances of gout which I have seen in this sex, previously to the change of life, have been chiefly in those who had suffered frequent or excessive menstrual evacuations, who had lived very fully and indolently, and who had not been pregnant. The relative immunity of females is evidently owing to their temperance, to their periodical evacuations, and to the discharges and secretions connected with child-bearing.

32. *d.* *Habit of body and temperament.*—Gouty persons are said to have capacious and circular chests, with large full veins, and loose solids; but to this rule there must evidently be numerous exceptions. SYDENHAM remarks, that the gross and corpulent, and those with large heads, are most frequently affected. J. P. FRANK states, that the *gouty conformation* consists of a large and full body, voluminous head, large bone, and thick skin. Sir C. SCUDAMORE found that, of 226 males, 64 were tall and corpulent, 41 middle height and corpulent, 25 short and corpulent, 28 middle stature and bulk, 14 tall and middle bulk, 21 short and middle bulk, &c.; and that of 28 females, 9 were tall and corpulent, 8 short and corpulent, 4 middle height and corpulent, and 4 short and slight. Corpulence usually precedes the disease, and often increases with the progress of it. The gouty generally possess good constitutions, abused by indulgence. The sanguineo-nervous and irritable *temperaments* are the most liable to be attacked by gout, although other diatheses may be also affected.—CADOGAN ascribed gout to three causes, which generally act conjointly; namely, *indolence, intemperance, and vexation*. Taking these in their wide signification, their importance cannot be controverted. In whatever *station of life* they prevail, particularly indolence and intemperance, gout will appear as one of the most frequent results; hence it is not infrequent in butchers, innkeepers, and publicans; and in butlers, coachmen, and porters in wealthy families, as well as in the more easy classes of society. It is, in short, met with

in all occupations which conduce to inactivity and repletion.

33. *e.* *Venereal excesses* are amongst the most unequivocally predisposing causes, especially if associated with the intemperate use of animal food and of wine; for whilst the former species of excess exhausts the nervous power, the latter occasions plethora, and both combine to impair the functions of digestion, assimilation, and excretion; hence the ancients said that gout was the daughter of Bacchus and Venus. The wines which favour most the production of gout, are champagne, new port, and the clarets; but other wines have more or less influence, and are more productive of the disease than malt or spirituous liquors. Strong malt liquor disposes to it even more than spirits. Dr. CULLEN justly remarks, that gout never attacks those following laborious occupations, or who live chiefly on vegetable food, or use neither wine nor other fermented liquors. SCHENCK, VAN SWIETEN, and other authors, have adduced numerous instances of persons, who, during a life of luxury and indolence, had been subject to this disease, but had never afterwards suffered from it when their circumstances required them to live abstemiously and laboriously. In countries where animal food, and vinous or intoxicating liquors, are little used, gout is almost unknown. The habit of partaking of a great quantity or variety of animal food is not less influential than other kinds of intemperance in causing the disease. Severe study has been considered to predispose to it; but this cause is merely apparent or indirect, others of a less doubtful kind also existing. The depressing passions are not without influence, inasmuch as they weaken nervous energy and the functions of digestion and excretion. A cold and variable climate favours, also, in some degree, the formation of the gouty diathesis; and the changeable weather in spring and autumn, and the cold winds and humid atmosphere of these seasons, have a similar effect. The disease is comparatively rare within the tropics, unless amongst those who have indulged in those habits which are most influential in predisposing to it; and yet two of the severest cases I ever saw, occurred nearly under the equator in Africa.

34. *f.* *Functional disorder of the digestive organs* is one of the most universal causes of gout. Many of the causes already noticed, and of those about to be mentioned, act partly by weakening these organs, and favouring congestion of, or inflammatory determination to, the mucous surface. It is not, however, a state of inflammation of this surface, but rather of vascular erethism, that is thereby generated. Hence the appetite, instead of being impaired, is often increased; and the patient is prompted to take more food than the stomach and collatitious viscera can digest and assimilate. When the appetite is impaired, owing to the digestive mucous surface having assumed a more inflammatory state, frequent attempts are but too often made to excite it by stimulating and savory articles of diet; and the mischief is thereby augmented. Even where functional disorder only exists, inflammatory irritation is superadded, attended by the severer symptoms of indigestion—by acrid eructations; by painful distension and soreness of the epigastrium; by congestion and impaired action of the liver; by interruptions of the passage of bile into the duodenum, accumula-

tions of it in the gall-bladder and ducts, and a redundancy of its constituents in the blood; by acidity of the *prima via*, and an imperfectly elaborated or unhealthy chyle; and ultimately, as will be hereafter shown, by a morbid state of the circulating fluids. But these are merely accessories to the formation of the gouty diathesis; other conditions, particularly vascular plethora, being also required; and this state, with the various other elements of the gouty constitution, is that which is generated, in a greater or less degree, by the causes now passed in review.

35. ii. *Exciting Causes*.—Whilst the foregoing causes act chiefly in generating the gouty constitution, or predisposition, those about to be mentioned are mainly concerned in exciting or developing the paroxysm. The sudden repletion and inflammatory excitement of the vascular system in connection with irritation of the digestive mucous surface, produced by excessive indulgences at the dinner table, frequently occasions a fit in a few hours, when the morbid diathesis is already formed; and, when the excess is repeated, particularly in quick succession, the morbid effect rarely fails to take place. Champagne excites an attack more certainly than any other wine. A lady under my care, and who had not passed her 30th year, always suffered more or less on the following day, after taking a single glass of champagne; but the excessive use of any wine, especially if new or of inferior quality, will produce a seizure. The use of malt liquor during dinner, and of port wine afterwards, will excite it, if active and regular exercise be not taken. Strong malt liquors and spirits will often have a similar effect, especially if much animal food be habitually eaten. It is not only indulgence in wine or other exciting liquors, or the admixture of them, that is injurious; for a great quantity and variety of animal food, and of highly seasoned dishes, which they excite the stomach to receive until it is overloaded, are equally prejudicial. Acidity of the *prima via*, from the imperfect digestion of the mass of different substances partaken of, inflammatory irritation of the digestive mucous surface, disorder of the biliary secretion and excretion, vascular plethora excessively or suddenly increased on each of such occasions, and the accumulation of excrementitious and irritating matters in the blood, are the common consequences of these indulgences. In many cases, not merely acid, but acrid or acro-rancid, combinations are formed by the imperfectly digested substances and the disordered secretions poured into the alimentary canal; and these increase or perpetuate the irritation of the mucous surface, whilst they exert upon the organic nerves a noxious influence, which is more or less manifested throughout the digestive circle, as well as in the extreme parts of the frame.

36. Neglected or constipated bowels, and interruption of any of the excreting functions, will occasionally be followed by an attack, without any cause having occurred that could have acted in any other way than this. Cold seems to operate, partly by suppressing the excretions, and partly by depressing nervous power. Its effects in exciting a paroxysm, whether applied to the general surface or to the extremities, or to any part, are well known. Fatigue and external injury not infrequently produce an attack: and the

injured part is usually its seat; especially in cases of sprains, contusions, or concussions. The passions of the mind, also, have no mean influence. All powerful mental emotions, whether exciting or depressing, will excite a paroxysm; but anger or vexation has this effect in a very remarkable manner. The ancients made Anger to be the midwife of Gout; and CADOGAN considered vexation, in its wide signification, as one of his three great causes of the disease. The depressing passions, particularly fright, severe grief, anxiety, &c., may either occasion an attack, or cause its retrocession, or give rise to a misplaced affection, or to some one of the irregular states of the disease noticed above, particularly in persons who have been formerly affected. Besides these, mental and bodily labour, especially when they abridge the requisite duration of sleep; the sudden cessation of habitual evacuations and excretions, as of the catamenia, hæmorrhoids, the *sudor pedum*, &c.; cold, flatulent fruits or vegetables; and acidulous liquors or beverages, sudden changes of diet or regimen; and whatever disorders the digestive and excreting organs, or suddenly impresses the nervous system; may excite the gouty paroxysm, either when the predisposition has been fully formed, or when an attack has been experienced. It is from a combination of two, or several, or even of many causes, that the disease is occasioned, especially if it appear independently of any hereditary taint. In a few instances, this taint seems almost sufficient to produce it, without the aid of any manifest intemperance. This remark was made by GALEN, and HOLLER and others have confirmed it. Cases sometimes, also, occur of persons entitled by both parents to be subject to the disease, who have escaped it, although they lived intemperately. QUARIN states, that he knew two brothers, sons of gouty parents: one of them lived soberly and laboriously, yet was horribly affected with gout; the other exposed himself to its common causes, and altogether escaped it: but these are rare exceptions from the general course of events.—It appears that females frequently acquired gout in ancient times, inasmuch as SENECA (*Epist.* 95.) mentions the circumstance as a proof of the depravity and luxury of his age.

37. V. The PATHOLOGICAL CONDITIONS, on which gout depends, may be inferred from what has been already advanced as to its causes and phenomena.—*a.* The older writers imputed it to a peculiar morbid humour existing in the blood. This *materies morbi* has been somewhat differently explained.—GALEN considered that it may be phlegm, or a mixture of phlegm and bile, or even blood, or all these, or simply a crudity of the circulating fluids; and that the gouty concretions arise from the crude humours.—PSELLUS believed that it is a thick humour generated and collected by an atony of the nutritive faculty.—ALEXANDER TRALLIANUS contended, that the defluxion of humours occasioning gout is various, according to the local changes and symptoms existing in different cases—that they are bilious, phlegmatic, melancholic, or even sanguineous; and that these occasion pain by getting between the tendons and ligaments, and distending and irritating them.—ÆTIUS maintained the disease to arise from a redundancy of humours caused by weakness of the part affected.—CÆLIUS AURELIANUS assigned the remote cause of gout with great accuracy, and

explained its nature in a nearly similar manner to the preceding writers. — PAULUS ÆGINETA considered that a preternatural humour and a weakness of the parts combine in producing the disease; and that the remote causes, which he enumerates very correctly, generate indigestion and a cacochymy, whence proceed various morbid humours which are bilious, melancholic, or sanguineous; but, for the most part, pituitous and crude, owing to excess of food and want of exercise. He attributed tophi or chalk-stones to thickness and viscosity of the humours, and the chronic or protracted forms of the disease to the admixture of several of these humours.

38. The doctrine of the humours, and the manner they give rise to arthritic complaints, have been fully explained by MACROBIUS (*Saturnalia*, vii. 4.). Mr. ADAMS, in the learned notes to his translation of PAULUS ÆGINETA, remarks that the theory of the humours, notwithstanding its being at present in little repute, accords better with the phenomena of the disease, and is a more successful guide to practice, than any hypothesis recently advanced. A similar preference to it has been given by SPRENGEL. It should also be mentioned, that the ancients, particularly those just noticed, recognised the hereditary character of the disease, and peculiar diathesis of gouty persons. The opinions of the Arabian writers are not materially different from those just stated. The most interesting production on the disease that has appeared, was written by DEMETRIUS PEPAGOMENOS about the middle of the 13th century, and was published at Paris in 1558. He states the remote causes of gout to be long-continued indigestion, repletion with food, drinking too much wine, venereal excesses, indolence or unaccustomed exertion, and retention of the natural secretions; the venereal excesses, especially, weakening the tone of nervous parts. These causes give rise to imperfect digestion, and the accumulation of excrementitious superfluities requiring to be evacuated from the system. When these excrementitious matters are retained, morbid humours are produced, and collected in the affected joints. This very ingenious writer further remarks, that when crudities or morbid humours are formed in the system, those parts which are vigorous cast them off; but that those that are weak are unable to accomplish this; and hence collections of such humours take place in them.

39. *b.* Many of the writers of the 16th, 17th, and 18th centuries were induced, by the appearance of the urine, and the concretions formed in the joints, to account for the phenomena of the disease upon chemical principles. — PARACELUS first, and HOFFMANN and others long afterwards, ascribed the local and constitutional affections to the presence of tartaric salts in the blood, — an opinion very generally adopted until the middle of the last century. More recently, FORBES, PARKINSON, WOLLASTON, HOME, BRANDE, and others have endeavoured to show that there is always a redundancy of uric acid in gouty persons; and, as will be shown hereafter, there can be no doubt that the constituents of this acid exist in them in excess. But this species of change is merely one of the elements of the gouty condition. The connection of the disease with plethora was very justly insisted on by Dr. CULLEN; and Dr. PARRY conceived that the paroxysm had a salutary in-

fluence in reducing a plethora relatively great, in restoring the balance of the circulation, and in determining the blood from internal and vital parts to the extremities. Here, again, is a part adduced for the whole of the mischief. Dr. SUTTON supposed that the cause of disorder is seated in the alimentary canal; but he attempted nothing beyond this very indefinite explanation. BROUSSAIS is more precise, if he be not more correct, in stating gout to be one of the several morbid manifestations depending upon inflammatory action in the gastro-intestinal mucous surface. In this opinion he has been pretty closely followed by ARMSTRONG, MACKINTOSH, and several writers of his own country. Dr. BATEMAN, Sir C. SCUDAMORE, and Dr. BARLOW have ascribed the disease to vascular plethora. Dr. BARLOW, especially, insists upon its inflammatory and plethoric nature, but pushes his doctrine too far; whilst he overlooks the connection of plethora with other morbid conditions.

40. *c.* It is indispensable to a correct view of the subject, to comprise all the elements forming the constitutional and local affections to which the term gout has been applied. If we analyse the numerous phenomena preceding, constituting, and following the disease; if we connect these with the causes most essential to their production; and if we refer to those agents which increase or diminish the severity of the symptoms; we must necessarily arrive at the conclusion, that gout does not depend upon one morbid condition only, but upon several; that neither the superabundance of excrementitious matters in the blood, arising from imperfect or effete assimilation — from the ultimate results of animalisation; nor vascular plethora, absolute or relative; nor gastro-intestinal irritation; nor gastro-hepatic disorder; is individually sufficient to explain all the changes constituting the disease; although they may be sufficient when viewed in connection. But, even when thus considered — especially if we push the analysis sufficiently far — some antecedent and concomitant lesion must be inferred. If we view the several causes in the connection and succession in which they usually give rise to gout, we must necessarily conclude, that the organic nervous energy is impaired or exhausted by them; and that, as the organic class of nerves bestows its influence on the digestive, the secreting, and excreting functions, exhaustion of its powers will impair the functions of the organs which it supplies. The necessary consequences of such impairment will be imperfect digestion and assimilation, torpor of the liver and bowels, impeded and disordered secretion and excretion, redundancy of excrementitious matters in the circulation, and vascular plethora, arising from deficient excretion, and from a continued supply of nourishment aided by a stimulated appetite. These may be viewed as the elements of the gouty constitution or diathesis; and, when it is formed, the local action will be excited by either, or by several, of the causes mentioned above (§ 35, 36.). That most of these causes affect the organic nervous influence more or less directly, is shown by the impaired or otherwise disordered functions of the organs more especially endowed by this system. To functional disorder and morbid sensibility succeed the accumulation of effete and irritating matters in the blood, and excited

vascular action, either local or general, or both. These matters aggravate the morbid sensibility and irritation, particularly in situations most prone, by previous disorder or debility, to experience either or both.

41. It is, however, not easy to explain satisfactorily wherefore the morbid action should manifest itself in the extremities, and assume peculiar characters, otherwise than by referring both circumstances to the previous change produced in the system—to the antecedent diathesis, either original or acquired; and to the morbid condition of the nerves, and of the exhalations and secretions of parts most remote from the centres of nervous power and of circulation. Weakness of the remote nervous ramifications will necessarily influence the circulation and secretions of the parts which they supply; and when the blood abounds with excrementitious matters, the exhaled and secreted fluids will necessarily possess preternatural or morbid properties, which will affect the sensibility of the extreme nerves, and irritate the tissues in which they are deposited. There are various phenomena, especially the sudden transition of the affection—which is sometimes as quick as electricity—from one part to another, that cannot be explained otherwise than by referring them to the organic nervous system. If we consider the intimate connection that exists between this system and the rest of the economy, and particularly the influence which it exerts upon the vascular system, which it supplies throughout; and view both in their intimate relations with one another, and with the rest of the frame,—if we contemplate them as intimately interwoven together—as possessing numerous and diversified communications with all the viscera and compound structures,—we shall easily conceive, that the altered sensibility existing in one part of this nervous circle may readily be transferred to other and distant parts, with the varying state of nervous influence, and with the several causes which may suppress it in its existing seat, or derive it to other organs; that a change in the state of the organic nervous influence, when preternatural or intense, may very obviously affect the capillary circulation and vascular action; and that, both nerves and capillaries being thus affected, the exhalations and secretions of the part will be also changed, particularly when the fluids circulating to it are in excess, or abound with excrementitious matters; the alteration of the fluids, both circulating and secreted, exalting the morbid sensibility and vascular irritability, and perpetuating the suffering, until the cause is removed, or both conditions are exhausted.

42. If this view be correct, several disputed matters connected with the disease will be more readily explained. For when the predisposition or diathesis is formed, and the organic nervous influence is morbidly affected in one or several parts, and the vascular system is inordinately repleted, causes affecting either the one or the other will not infrequently transfer the morbid action from one seat to another. The local affection of gout being the external manifestation of a constitutional disease, the suppression of it in one part will often be followed by its appearance in another; and its spontaneous extension to a new situation will as frequently de-

rive it from its former seat;—for as long as the constitution continues in fault, nervous power being impaired, the vascular system overloaded, and the blood abounding in excrementitious matters, some organ must experience more or less prominent disorder. This view of the nature of gout further enables us to account for the primary seizure of an internal part or viscus; for, in proportion to the deficiency of nervous power, or to the abundance or vitiation of the circulating fluids, or to the weakened or congested state of some viscus, will the disposition to a misplaced or lurking form of gout exist; the vital manifestations being incapable of developing the disorder in the extremities, owing either to their impairment, or to the extent of the derangements just mentioned, or to both circumstances conjoined.

43. VI. TREATMENT.—i. The *Opinions of the Ancients* as to the treatment of gout, are in many respects as deserving of notice as those of modern writers. Indeed, there is little difference between the views of some of the former on this subject, and those of the latter. As at the present day, so in ancient times, were cold applications to the part, and colchicum internally, advised by some and condemned by others; so also, as may be seen from the *Tragopodagra* ascribed to LUCIAN, were numerous nostrums lauded for the complaint, as well as a rational treatment pursued by the regular practitioners of physic; and so also, as at the present day, the habits and irregularities of the patient brought discredit on the science of the physician, and led to the too general adoption of the opinion of OVID, that—

“Tollere nodosam nescit medicina podagram.”

44. HIPPOCRATES recommended purgatives by the mouth and by injection, and cooling applications to the part. In the more chronic cases, he advised means similar to the moxa of the Japanese.—CELSUS also prescribed refrigerant applications to the affected part; but he likewise had recourse to warm fomentations conjoined with anodynes, and to depletions.—ARETEUS seems to have trusted chiefly to hellebore, and to applications of wool moistened with various substances, as oil, oxycrate, &c.—GALEN commenced the treatment of gout by evacuating offending matters by bleeding and purging; he afterwards had recourse to discutient applications.—CÆLIUS AURELIANUS directed blood to be abstracted from the part by scarifications, and sponges squeezed out of hot water, or oil and water, or a decoction of fenugreek, to be afterwards applied. He also prescribed gentle emetics and aperient clysters. He disapproved of burning the parts, and of the indiscriminate use of narcotics; but advised warm bathing, spare diet, emollient ointments, and afterwards gentle exercise. He enjoined complete abstinence from the commencement of the attack; and at its decline he prescribed a medicine nearly the same as the Portland powder.—ORIBASIVS confided chiefly in bleeding and purging, especially in plethoric persons, and in the spring. AETIUS evacuated redundant humours by these means; and afterwards endeavoured to strengthen the parts.

45. ALEXANDER TRALLIANUS adopted a treatment which he viewed as appropriate to his pathology of the disease. In cases proceeding from a bilious humour, as indicated by burning heat and

the absence of swelling, he prescribed chologogue purgatives, consisting chiefly of cathartics and bitters conjoined, and cooling anodyne applications to the affected parts, with spare diet. When occasioned by a phlegmatic humour, indicated by the absence of heat and redness, he considered calefacients to be beneficial, and refrigerants injurious; and recommended a combination of purgatives and attenuants, as hellebore, thyme, cumin, &c. After purging, he directed warm attenuants internally, and calefacient anodyne cataplasms to the external affection. When there was general fulness of blood, or determination to the affected joint, he advised bloodletting, and abstinence from wine and animal food, and discutients to the part. He has remarked, that some insist upon taking medicines to allay at once the violence of their pains, not choosing to submit to a methodical treatment; but that he does not approve of this practice. For this purpose, he adds, the *hermodactylus* is particularly trusted to; and he admits that it seldom fails to remove a paroxysm; but he also affirms that it occasions more frequent returns of it. The identity of *hermodactylus* and *colchicum* is highly probable, as maintained by PROSPER ALPINUS, Sir H. HALFORD, and others. ALEXANDER has further stated, that some endeavour to correct the prejudicial effects of this medicine by adding to it cumin, mastic, or ginger, thinking that its action is narcotic; but this he affirms to be a mistake; for in that case it could not prove cathartic. He admits, however, that these things may correct its bad effects upon the stomach; and he therefore prescribes a combination of the *hermodactylus* with aniseed, pepper, and myrrh, or with aloes, scammony, elaterium, colocynth, &c. He preferred, however, the *coronopodium* (which Mr. ADAMS, in his learned commentaries on PAULUS, believes to be the buckthorn plantain or *plantago coronopus*), as it procures evacuations and relief from pain, without injuring the stomach.

46. PAULUS ÆGINETA advised a nearly similar method to that adopted by ALEXANDER. He employed chologogue purgatives for the evacuation of bilious humours, when he inferred gout to arise from this cause; and numerous cooling and anodyne cataplasms to the affected part, with a refrigerant and diluent diet, avoiding repletion and the use of heating dishes or liquors, as well as mental emotions and venereal indulgences. In the sanguineous form of the disease, and in the first attacks, he enjoined bloodletting and purgatives; the latter consisting chiefly of a combination of colocynth, aloes, black hellebore, and scammony. Some, he has remarked, have recourse to purging with *hermodactylus*; but it is bad for the stomach, producing nausea and anorexia, although it removes the disease very speedily. In gout from a mixture of humours, he also had recourse to depletions in early attacks; but, after frequent seizures, he considered the loss of blood injurious. Besides these, he directed a variety of both internal and external means; many of which deserve adoption, and are similar to those hereafter to be noticed. With respect to *prophylaxis*, he advised a moderate use of wine, exercise, and frictions of the joints, morning and evening, with oil triturated with salt.

47. The opinions of the Arabian physicians differ not materially from those of the Greeks.—

SERAPION, AVICENNA, and RHASES recommended evacuations and the *hermodactylus*.—HALY ABBAS directed bloodletting in cases proceeding from sanguineous plethora; and used cooling applications to the joints. For the bilious defluxion, he prescribed emetics and drastic purgatives, consisting of scammony, aloes, colocynth, and *hermodactylus*; and for the serous or phlegmatic defluxion, very nearly the same means, the local applications being varied. The treatment adopted by ALSAHARAVIUS was almost identical with that pursued by ALEXANDER, PAULUS, and HALY ABBAS.

48. DEMETRIUS PEPAGOMENOS has justly remarked that the *prophylaxis* of gout is easily prescribed, but followed with great difficulty. It consists in great moderation in eating and drinking, and in avoiding indigestion. Viewing the disease as one of repletion, he ordered evacuations for its cure, consisting of emetics, bloodletting, and purgatives, and with a very judicious reference to the form and stage of the disease. He forbade the use of strong emetics; but vomiting by gentle means he had recourse to at the commencement. In early attacks, and at their beginning, when there was evidence of plethora, he prescribed bloodletting; but he considered it prejudicial in other circumstances, or much inferior to active purging. He was favourable to the use of *hermodactylus* as a purgative, and combined it with aromatics. In other respects his treatment was similar to that of ALEXANDER.

49. The reader will observe, from what has been just stated, how little has been added to our knowledge of this subject by the numerous productions that have appeared since the revival of learning in Europe; and that, although there is much that is trifling, a little that is absurd, and something that is questionable, in the doctrines and treatment of gout adopted by the ancients, there is also much deserving of commendation and adoption.

50. ii. *Treatment of Acute Gout*.—The indications are—1st. To avert a threatened attack;—2d. To alleviate the symptoms during the paroxysm;—and, 3d. To prevent the return of the disease, by suitable regimen and medical treatment, after the paroxysm has ceased.—A. In order to avert, or to render more mild, a threatened attack, the *premonitory symptoms* should be treated promptly and judiciously. Much suffering and injury to the constitution have arisen from the idea that the paroxysm is a salutary effort of nature, and that the prevention of it may be followed by serious consequences. There is, however, some truth in the opinion; for, as I have shown, the external affection being the outward manifestation of constitutional disease, the suppression or prevention of it in an external part may lead to results still more severe than the impending attack. But it is the suppression of the paroxysm by means which leave the constitutional disorders untouched, or which increase them, that is injurious, and not the prevention of it by remedies directed to the removal of these internal disorders themselves, in which the attack originates. A large dose of an acro-narcotic, as of *colchicum*, *veratrum* or *veratria*, *aconitum*, &c., has often the effect of suppressing the morbid sensibility, and with it the irritative vascular action of the seizure; and thus frees the patient

from the impending suffering for a time. But it leaves the internal disorders, of which the external is merely a part, in the same state as before, or even increases them; inasmuch as it tends to weaken organic nervous power, to irritate the digestive mucous surface, and to impair the functions of excretion; and the consequence is, either a more frequent return of the precursory symptoms of the attack, or the supervention of some serious visceral disease. The means, therefore, to be had recourse to, in order to avert the paroxysm, should be those only which are calculated to remove the internal derangements, in which it originates. These derangements we have seen to be—weakened organic nervous power; a torpid state of the functions of the liver, with accumulations of bile in the biliary passages and liver; congestion of this viscus; fæcal accumulations in the large bowels; collections of mucous sordes on the digestive mucous surface; vascular erythema, or inflammatory irritation of this surface; and the superabundance of excrementitious matters in the circulation. Means, therefore, which will remove these conditions, and prevent their recurrence, will the most effectually avert both a threatened paroxysm, and a return of the disease.

51. Guided by those views, general *bloodletting* may be employed in robust and plethoric persons. If signs of congestion of the head or of the liver be present, or of inflammatory irritation of the digestive mucous surface, local depletions may be substituted, or used in addition to the general evacuation. The quantity of blood taken away should depend upon the age and strength of the patient, and other circumstances of the case. Hæmorrhoidal or other spontaneous evacuations ought to be encouraged by aloetic purgatives, &c. If the tongue be much loaded, and if heartburn, acrid eructations, or nausea be complained of, neither pain nor tenderness of the epigastrium being present, an *emetic* will generally be of service. But if vascular depletion be indicated, it should be premised. Emetics have been recommended by CELSUS, FABRICIUS, HILDANUS, GESNER, STOLL, SCUDAMORE, and others: they will be found most serviceable as here advised; in other circumstances, they are doubtful means, and require much discrimination. If indigestible matters remain in the stomach, emetics should not be withheld; but when there are pain and tenderness at the epigastrium, with determination to the head, they may be injurious.—In almost every case *purgatives* should be prescribed, although the bowels may have been said to be regular or open; for collections of morbid secretions in the biliary organs, and of fæcal matters in the cells of the colon, may nevertheless exist. Therefore, a full dose of *calomel*, with *camphor* or with *James's powder*, or with both, may be given at bed-time, and a stomachic purgative the following morning. The draught here prescribed, I have found most efficient, especially when the bowels are very sluggish; and the frequent repetition of it is attended by no disadvantage:—

No. 233. R. Infus. Gentianæ Comp., Infus. Sennæ Comp., aa ʒj.; Magnes. Sulphatis ʒjss. (vel Sodæ Subcarbon. ʒj.); Tinct. Cardamom. Co. et Tinct. Sennæ aa ʒjss. M. Fiat Haustus, quamprimum mane sumendus.

52. If the excretions continue to present, or assume morbid appearances, a small dose of blue pill, or of hydrargyrum cum creta with soap, or

a full dose of calcined magnesia, should be taken at bed-time, and the above draught in the morning, until they assume a natural character. If the precursory symptoms continue nevertheless, I agree with Sir C. SCUDAMORE in considering that the constitution is labouring under the causes of the paroxysm, almost as much as if the attack had been developed, and that the treatment required during the paroxysm should be resorted to. If the means here recommended restore the functions to a healthy state, abstinence or moderation in diet, regular exercise, especially on horseback, mental quietude, and early hours, should be strictly observed.

53. *B. The Treatment of the Paroxysm* should be varied according to the age, strength, and habit of body of the patient, to the predisposing and exciting causes, to the duration and characters of the paroxysm, and to the frequency and severity of the previous seizures.—*a. Bloodletting* is required in the plethoric and robust, and in early attacks, when the constitution is unbroken, and the inflammatory diathesis evidently exists. In these circumstances it has been advised by CELSUS, GALEN, ALEXANDER, HORSTIUS, RIVERIUS, JUMELIN, LE TELLIER, SYDENHAM, PATTEN, HUXHAM, CULLEN, HOSACK, MUSGRAVE, MACBRIDE, DE VERNEVIL, HEBERDEN, SCUDAMORE, &c. It has been too strongly insisted upon by HAMILTON, RUSH, and BARLOW; whilst it has been considered injurious by TRAMPSEL, BARTHEZ, HALLÉ, and GUILBERT, unless when the inflammatory action is very manifestly developed in some internal organ; or in strong plethoric persons, when the general vascular excitement is very great.—The practitioner should be guided as to the extent of the depletion, by the circumstances above alluded to; keeping in view the fact, that the disease is one more of irritation than of inflammation; that the vascular excitement is in great measure the consequence of the morbid sensibility, and will subside as it is subdued. *Local depletions* are often preferable to general bloodletting, particularly when tenderness, or fulness of the epigastrium or hypochondria, is present, and will generally be sufficient to remove hepatic congestion, and vascular excitement of the gastro-enteric mucous surface. When bloodletting is clearly indicated, it should not be delayed; as the benefit it is calculated to afford will be diminished very materially by delay; the debility consequent upon unmitigated irritation, rendering the deferred depletion of little or no avail.

54. *b. Alvine evacuations* are of less doubtful efficacy even than vascular depletion.—*Emetics* are sometimes of service at the commencement of the paroxysm, when the symptoms indicating (§ 51.) the propriety of resorting to them are present. In some cases they mitigate the attack; whilst in others they have little or no effect upon it. They ought to be employed with caution. When the case requires both vascular depletions and an emetic, the latter ought not to be exhibited until the former has been carried into effect.—*Purgatives* are of the most unequivocal benefit. Many of the empirical remedies employed against the disease are serviceable only in as far as they increase the alvine excretions. As vascular congestion of the liver, and accumulations of bile in the biliary passages, are often connected with the production of the fit, such purgatives as promote

the circulation in this organ, and increase its excreting function, should be selected. With this view, from five to ten grains of calomel, with four or five of James's powder, maybe given at bedtime, and the draught prescribed above (§ 51.) early on the following morning. If these do not act in the course of a few hours, a dose of magnesia, and of sulphate of magnesia in any aromatic water, may be taken, and repeated until the bowels are freely opened. Purgatives were actively employed in gout by the ancients, *veratrum* and *hermodactylus* having been chiefly used with this intention. RHazes advised a cathartic to be repeated eight times. RIVERIUS, RIEDLIN, THILENIUS, CADOGAN, and most English writers, have recommended them. SCHREDER preferred the preparations of rhubarb; and these, conjoined with magnesia, or any of the other purgatives in common use, may be prescribed. Sir C. SCUDAMORE prescribes the *colchicum* in the first aperient draught, giving from one to two drachms of the acetic preparation, neutralised by magnesia, and conjoined with the sulphate of magnesia. This medicine he repeats at intervals of four, six, or eight hours, according to its action, and the urgency of the symptoms. Although this is amongst the mildest of the preparations of *colchicum*, especially when its acetic acid is neutralised by magnesia, yet I have seen it, in this dose, productive of serious effects; and it is more likely to be injurious when it fails in acting upon the bowels; for in this case its influence is exerted upon the nervous system, and not upon the excreting functions—the morbid sensibility being partially suppressed by it, but the source of disorder remaining untouched. The consequences are, either a frequent return of the fits, or a continuance of the internal affections in aggravated forms, or the supervention of some one of the irregular states of the disease. Where biliary accumulation or congestion of the liver exists, a large dose of *colchicum*, unless conjoined with an active stomachic purgative, may, in the early stage of the paroxysm, so suddenly suppress it, as to give rise to the serious affections alluded to under the head of retrocedent and misplaced gout (§ 18. 21.).—This is no suppositious case, for two such instances have fallen within my own observation, one of which has been already adverted to (§ 19.).

55. In early fits of the disease, when much inflammatory excitement exists, *colchicum* may be conjoined with the cooling saline purgatives, and with magnesia, as Sir C. SCUDAMORE advises; but the dose should be much less than just mentioned, and ought seldom to exceed half a drachm of any of the fluid preparations; and it should not be given more frequently than thrice in the day, until the effects are observed; as even in this quantity, I have seen it have, in some constitutions, a very remarkably sedative influence, producing even serious symptoms. In several persons, and three of these members of the profession, I have observed that even twenty drops of the mildest preparations of *colchicum* could not be taken without most distressing internal irritation, and a sense of sinking being produced. This effect still more frequently occurs in the atonic or chronic states of the disease. Therefore, when the patient is either advanced in life, or has suffered repeated attacks, or is possessed of

weak constitutional power, the combination of *colchicum* with antacids, and warm stomachics, or the *spiritus colchici ammoniatus*, will be most appropriate; and either the infusion of senna, or of rhubarb, or the decoction of aloes, may be added to them, in such quantity as may be required to operate freely on the bowels.

No. 234. R. Infus. Caryophilor., Infus. Sennæ Comp., aa 3vj.; Magnes. Calcinatæ ʒj.; Tinct. Rad. Colchici, Mxxv. (vel Aceti Colchici 3ss.); Spiritus Pimentæ, 3ss. M. Fiat Haustus, ter in die sumendus.

No. 235. Infusi Aurantior. Comp., Infus. Rheī, aa 3vj.; Magnes. Carbon. ʒj.; Vini Seminis Colchici 3ss. (vel Spirit. Colchici Ammon. Mxxxv.); Tinct. Cardamom. Comp. ʒj. M. Fiat Haustus, sextâ quâque horâ sumendus.

No. 236. Decocti Aloës Comp. 3vij.; Aquæ Menth. Virid. 3ivss.; Tinct. Seminis Colchici 3ss.; Spirit. Ammoniac Arom. ʒj. M. Fiat Haustus.

No. 237. Sodæ Sub-carbon. 3ss.; Vini Colchici (vel Spirit. Colchici Ammon.) 3ss.; Infusi Sennæ Comp., Infusi Aurant. Comp., aa 5vj.; Spirit. Lavand. Comp. ʒj. M. Fiat Haustus.

56. It will often be necessary, especially when the countenance is sallow or bilious, the hypochondria and epigastrium full, or tender on pressure, to exhibit on alternate nights, or even every night, a dose of calomel, or of blue pill, with James's powder. But care should be taken that the mercury does not produce its specific action, which very generally will be prevented by the active exhibition of the purgatives just mentioned. Where much febrile excitement exists, James's powder, or some other antimonial, with or without an anodyne, according to circumstances, should be prescribed; and if nervous power be much reduced, two or three grains of camphor may be either substituted for these, or conjoined with them. The *colchicum* may be given in the form of pill, the powder being combined with camphor and the watery extract of aloes, or the aloes and myrrh pill, three or four doses being taken in the 24 hours, and as much of the purgative as will operate sufficiently on the bowels. The action of *colchicum* is exerted chiefly on the digestive mucous surface and liver, the secreting functions of which it manifestly augments. When it does not pass quickly off by the bowels, it is partially absorbed, and increases the functions of the kidneys. It was employed by the ancients, and physicians of the middle ages, and entered into the composition of most of the gout specifics of every epoch. STOERCK introduced it into regular practice in modern times, and used it chiefly as a diuretic. Mr. WANT brought it into use in 1815 as a cure for gout. Since then it has been very generally, and but too often injudiciously, employed in this and in other diseases.

57. Cathartics are not equally suited to all cases. Where the bowels are very torpid, the liver congested, and the tongue loaded, they (see *Appendix*, F. 181. 266. 378. 430.) are necessary, and it is chiefly by them that we can remove the excrementitious matters abounding in the circulation. But in other instances, particularly when these disorders do not exist, or when the bowels are easily relaxed, or are irritable, and when the patient is nervous and debilitated, aperients or laxatives, and saline medicines with the alkali in excess, or calcined magnesia with or without *colchicum*, will be more serviceable than active purgatives, unless conjoined with tonics, aromatics, or stimulants.—Neutral salts, taken so as to act gently upon the bowels, have generally also a refrigerant effect; and being partially absorbed,

exert a beneficial influence on the circulation and functions of the kidneys. When the saline medicine is conjoined with an alkali or with magnesia, these effects are still more manifest, and not only are the intestinal discharges increased, but the urine is rendered more copious and natural. Colchicum judiciously combined with these will often allay pain, bring down the pulse, and promote the secretions from the liver and kidneys; but if it occasion depression or nausea, it should be discontinued. Although purgatives are unequivocally beneficial when employed as here advised, yet SYDENHAM, WARNER, and most French writers have condemned the use of them in this disease. Even HEBERDEN does not appear favourable to them. This, however, evidently arises from either an injudicious use of them, or inappropriate modes of exhibiting them.

57. *c. Diuretics* are beneficial in this disease, in as far as they promote the removal of excrementitious matters from the circulation. The saline substances already alluded to, and the alkalies, are, upon the whole, the most preferable of this class of medicines. Of the former, the citrates of potash and of soda, the acetate of potash, and the sulphates of soda and magnesia, are to be preferred; and of the latter, the fixed alkalies, and magnesia. M. MAZUYER recommends potash and its acetate, from an opinion that the presence of uric acid in the blood is a principal cause of the disease. Alkalies in various forms have been long recommended in gout. In the form of soap, they have been prescribed by BOERHAAVE and WHYT. Their subcarbonates were used by TOZZI, QUARIN, BLANE, GARDNER, WOLLASTON, and others. The alkaline earths have, however, been preferred by several writers, especially when acidity of the *prima via* existed. WHYT and BLANE were favourable to lime-water, and preparations of chalk, in these circumstances. Magnesia, both calcined and carbonated, has been generally employed, and is preferable, upon the whole, to any other absorbent, inasmuch as it acts gently upon the bowels and kidneys, without weakening the digestive mucous surface. Its effects in removing the morbid state of the urine in gouty subjects, which has been so well described by Dr. PROUT, and noticed above (§6.14.), are very remarkable. The liquor potassæ, or BRANDISH's alkaline solution, exhibited in a bitter infusion, with the extract of taraxacum, or in the decoction of taraxacum, will also be found useful, especially when chronic disorder of the liver is present; small doses of blue pill, or of PLUMMER's pill, with soap, being given at bedtime, and the emplastrum ammoniaci or the emplastrum picis compositum conjoined with it, being placed on the epigastrium, and right hypochondrium. The preparations of squills, or the spiritus ætheris nitrici, may be given with the saline and alkaline substances just noticed, when the urinary secretion is scanty.

58. *d. Diaphoretics* during the paroxysm have been recommended by some writers, and disapproved of by others. There can be no doubt of perspiration being a favourable evacuation in this, as in many other diseases, inasmuch as excrementitious matters are thereby removed from the system. QUARIN remarks, that those who sweat much, or void much urine, are rarely afflicted with gout; and the reason is obvious. Sir C.

SCUDAMORE states, that sudorifics should be given with some caution, as they tend to debilitate the stomach; and this is doubtless the case with respect to the common preparations of antimony, although RHODIUS, RIVERIUS, VICAT, BRANDIS, and HUFELAND prescribed them when inflammatory fever accompanies the paroxysm: and in this state they are beneficial, especially when conjoined with gentle refrigerants and narcotics. DOVER strongly recommended his celebrated powder in this case; but he employed nitre, instead of the sulphate of potash of the more modern preparation. Camphor, however, in doses and combinations appropriate to the circumstances of the case, is a most unexceptionable medicine, inasmuch as it has an anodyne effect, whilst it promotes the exhalations and secretions. It may be conjoined with James's powder, or with mercurials, or with anodynes, or with all of them, according to existing pathological states. It has been almost entirely overlooked by recent writers on the disease, although it was recommended by LENTIN, CHRESTIEN, COLLIN, BANG, and OSIANDER. I have prescribed it frequently, especially in the more chronic and irregular forms of gout; and found it, particularly in conjunction with opium, or the acetate or muriate of morphia, a most valuable remedy. The decoction of *guaiacum* was much employed by SABAROT, TODE, WEISMANTEL, GRUNER, SMETIUS, THEDEN, AASKOW, ACKERMANN, DUNCAN, and BALDINGER; but it is more suitable to the atonic or chronic states of the disease than to the acute. It is, however, sometimes useful, conjoined with alkalies and anodynes, after the bowels have been freely evacuated, in old cases and in debilitated habits. It is most beneficially exhibited in the form of compound decoction, as prescribed in the Edinburgh and Dublin Pharmacopœias; or in that of the ammoniated tincture, when debility is considerable.

59. *Warm baths and vapour baths*, simple and medicated, have been long recommended as diaphoretics, for the removal of gout in its various forms. ACTUARIUS, ZACUTUS LUSITANUS, LENTIN, GIRAULT, QUARIN, BRANDIS, ALBERS, SCHACHER, RULAND, PALLAS, WAIZ, MOLWIZ, OLIVER, and INGRAM prescribed them. Sulphuretted baths, warm salt-water baths, and aromatic warm or vapour baths, have been favourably noticed by THILENIUS, QUARIN, ALBERS, and HUFELAND. The simple vapour bath was much praised by MARCARD and BLEGBOROUGH; and warm baths prepared from a decoction of emollient herbs, by PELARGUS and others. The *camphorated vapour bath* promises to be more serviceable than any of these, although they are severally of advantage when appropriately used.

60. If the patient be young and robust, or suffering a first or early attack, or if the constitution be not materially impaired, and especially if vascular excitement and pain be very great, the several means already noticed may be so prescribed as to produce decided antiphlogistic and refrigerant effects. The *antiphlogistic treatment*, to the fullest extent, has been advised by LANGIUS, WERLHOF, HUFELAND, BARLOW, and others; and in the circumstances just specified, or even in others more equivocal, it is more or less beneficial. — *Refrigerants*, as nitre, muriate of ammonia, &c., have been given internally by

MARCUS, and others ; and, in the above circumstances, they may be serviceable ; but in persons of weakly habits, and in the more protracted cases, their effects should be carefully watched. In most instances, the saline aperients and diuretics prescribed above prove sufficiently refrigerant ; and the more cooling diaphoretics, particularly camphor julep, the solution of the acetate of ammonia, and spirits of nitric ether, have a similar effect.

61. *e. Narcotics* have been long employed during the height of the paroxysm, both internally and to the affected part. AËTIUS, ZACUTUS LUSITANUS, MAYERNE, DE LAUNAY, and many others have recommended them. — *Opium*, either in its crude state, or in the form of DOVER'S powder, or of SYDENHAM'S laudanum, has been preferred by DE HEIDE, DOEMLING, NUNN, WARNER, MATTHEI, KINGLAKE, MARCUS, SUTTON, GUILBERT, &c. Several writers have, however, chosen either the black drop, or BATTLE'S solution, whilst contemporary practitioners have recourse more frequently to the acetate or muriate of morphia. More advantage, however, will accrue from the judicious combination of the opium with other remedies, than from a selection of either of these preparations. Opiates ought never to be prescribed until fæcal accumulations and morbid secretions have been evacuated. If prescribed earlier, or otherwise improperly used, they are liable to the same objections as have been urged against colchicum — one of the effects of which, it should be recollected, is anodyne. Dr. CULLEN remarks, that although they mitigate the severity of the fit, they occasion its return with greater violence ; but this objection holds equally strong in respect of all narcotic and anodyne substances employed without sufficient regard to the removal of those morbid conditions of the internal viscera upon which the disease chiefly depends. It is, therefore, indispensable to a successful treatment, to evacuate morbid matters previously to the use of these medicines ; and to promote the action of excreting organs, whilst we employ them. In weakly habits, or where there seems to be a state of asthenic or irritative action in the fit, and particularly if the external affection shifts its seat, the opiate should be conjoined with camphor, in doses proportioned to the urgency of the nervous symptoms, or of vital depression. This combination will promote the cutaneous excretion ; the camphor preventing any tendency to the retrocession or suppression of the paroxysm that may exist, or that the opium may occasion. HAMILTON, PLENCIZ, and some other writers have advised calomel to be conjoined with the opium. When chronic disease of the liver is present, the practice is judicious ; but purgatives should also be prescribed, and the effects carefully watched. The mercurial ought to be withdrawn when relief is obtained, or as soon as it evinces its specific action. Where there is much febrile excitement, the opiate will be usefully conjoined with James's powder, or other antimonials, or with ipecacuanha and refrigerants. The acetate or muriate of morphia should be preferred when opium occasions headache, gastric disorder, or other unpleasant effects ; and either may be given with aromatics, camphor, &c., according to the peculiarities of the case. A large dose of the extract of *white poppy* may be directed in similar circumstances.

62. *Aconitum* has been recommended chiefly by Continental physicians, and is certainly a medicine of greater efficacy than is generally supposed in this country. It has been favourably noticed by STOELLER, BOEHMER, REINHOLD, STOERCK, QUARIN, STOLL, VOGEL, COLLIN, MURRAY, THICKNESS, WARBURG, ZADIG, BARTHEZ, and BRERA ; but it is more appropriate to old or chronic cases, or to weak habits of body, than to recent attacks attended with general vascular excitement. The powdered leaves, or the extract, may be used. Besides its narcotic effect, it produces a very decided action on the skin. *Belladonna* has likewise been prescribed by ZIEGLER, BOETSCHER, and MÖNCH ; *Conium*, by PERCIVAL, SOLENANDER, COSTE and THICKNESS ; the *Humulus Lupulus*, by FREAKE ; and the *Lactucarium*, by DUNCAN and SCUDAMORE. *Hyoscyamus* is, however, preferable to either of these, when it is desirable to avoid constipation of the bowels. I have, however, seen the belladonna very serviceable in two or three instances ; and in these it produced its specific eruption on the skin.

63. *C. Local Treatment in the Paroxysm.* — *a. Leeches* have been applied to the inflamed part by WERLOFH, DE HAEN, BOYER, and MACKINTOSH ; and even *scarifications* have been advised by SALMUTH, THILENIUS, RIEDLIN, HOFFMANN, BAUER, REUSNER, and WATTS. Sir C. SCUDAMORE remarks, that he has seen, in a few cases, the application of leeches followed by the sudden transition of the inflammation to the other limb, indicating that the constitutional causes were not relieved by the local loss of blood ; and that he has generally found the debility of parts and œdema both greater and more lasting after this practice. In three instances, where he directed blood to be taken from the distended veins near the foot, an increase, rather than diminution, of pain was the consequence in two, and much local weakness in the third of them. — *Blisters* applied to the affected part have been recommended by BOUVART, RIEDLIN, and STEVENSON. TREMPER considers them injurious ; and Dr. CULLEN admits the occasional efficacy both of them and of urtication, but considers them hazardous. They are sometimes, however, useful in the more chronic or asthenic states of the disease. — *Moxa*, as a local application to gouty joints, has been resorted to in Eastern countries from time immemorial, and appears to have been known to HIPPOCRATES and subsequent ancient writers. Amongst the moderns, BOSE, TEN RHYNE, THILENIUS, PECHLIN, THEVENO, ACERBI, PALLAS, KAEMPFER, VALENTINI, and INGRAM have noticed it. Sir W. TEMPLE (*Works*, vol. iii.) derived benefit from it in his own case.

64. *b. Fomentations and poultices*, both simple and medicated, have been long advised for gout. HORNUNG and RIEDLIN have directed fomentations with an infusion of tobacco, and KUNRATH poultices with the leaves of *hyoscyamus* ; but, although they may relieve the pain, they relax and weaken the parts. ALEXANDER TRALLIANUS has stated, that they occasion a chronic state of disease, and favour the formation of concretions. Poppy fomentation, the vapour of hot water impregnated with aromatic herbs, and various emollient herbs and flowers used in the form of poultice, have been recommended. GRÜLING has advised the application of the infused flowers

of the sambucus; but it is very doubtful whether any of these is truly beneficial. Sir C. SCUDAMORE, however, remarks, that a poultice made with bread, scalded with boiling water, pressed through a strainer to dryness, and then rendered sufficiently soft by the addition of one part of alcohol, and three of camphor mixture, is frequently of service when applied just tepid directly to the affected part, and kept on during the night only. This writer states, that he has employed, with the best success, a lotion composed of one part of alcohol and three of camphor mixture, rendered agreeably lukewarm by the addition of a sufficient quantity of boiling water, and applied by means of linen rags. He remarks, that if the temperature be higher, it is less beneficial; and if it be lower, it is liable to the objections urged against cold applications. — *Warm pediluvia* have been resorted to, but are injurious whilst the inflammation remains. Sir C. SCUDAMORE has seen the symptoms reproduced by their employment at the decline of the paroxysm, and has adduced instances where they caused a metastasis of the local affection. Combed wool, and various other applications, made with a view to accumulate the warmth, and promote the perspiration of the part, have been very much resorted to; and I have seen much relief obtained from soft flannel wrung out of warm water, wrapped about the part, and closely covered by oil-skin; but this practice is open to the objections already noticed.

65. c. *Local refrigerants* have received the sanction of HIPPOCRATES, CELSUS, CAMERARIUS, ZACUTUS LUSITANUS, KOLHAAS, KECK, VANDER HEYDEN, BARTHOLIN, PECHLIN, BERGIUS, LAUZANI, PIETSCH, and KINGLAKE. Dr. HEBERDEN states, that the celebrated HARVEY applied cold in his own case. Dr. GOOD followed his example in his early attacks, and whilst the vigour of his constitution was not materially impaired; afterwards, when the disease appeared with more debility and irritability of the system, he judiciously refrained from this practice. In strong persons, the application of cold will afford relief, and it may not be injurious; but in other circumstances, it is hazardous. MARCARD, and numerous writers since his time, have shown its bad effects; for, like all other means tending to relieve the local affection, whilst the constitutional disorder remains untouched, it may cause the transition of the disease to some other situation, either external or internal. — The application of *veratrina* or of *aconitine* to the part, in the form of ointment, (*Veratrinae gr. x—xv.*; *Adipis præpar. 3iv.*), has been recommended by Dr. TURNBULL, but it is liable to the objection just urged. — The leaves of the *Cactus Opuntia* have been used as a poultice, by PAULE and PAPEN; and relief has been derived from the common cabbage leaf. I have seen a steak of raw beef, applied either whilst still warm, or immediately after it was cut from the recently killed animal, produce remarkable relief, and without any consequent inconvenience. It is deserving of further trial. These two latter are popular remedies in some countries.* — External

applications of an active kind are generally either of little benefit, or are hazardous, in the nervous or debilitated; in persons liable to painful affections of the stomach and bowels; in those subject to palpitations or irregular action of the heart, or to disorders referable to the encephalon; and in those complaining of diseases of the lungs, or of asthmatic attacks. — The tepid lotion and poultice advised by Sir C. SCUDAMORE, and liniments of oil of almonds and camphor liniment, or tepid epithems, are, upon the whole, the safest and best.

66. D. *The Diet and Regimen during the paroxysm* should be strictly regulated. — In this form of gout, especially, the diet should be spare, cooling, and chiefly farinaceous. Boiled bread and milk are praised by Sir C. SCUDAMORE; but it sometimes produces acidity; which, however, may be prevented or corrected by the admixture of a small quantity of calcined magnesia. Arrow-root, sago, or panada slightly spiced, will generally be sufficient as long as febrile excitement continues; but in nervous, debilitated, or irritable habits, a little Madeira or sherry, or a dessert spoonful of brandy, may be added to these. As the paroxysm subsides in these constitutions, a little light animal food, and an additional allowance of wine, may be permitted, particularly if the patient's previous habits require the indulgence. The best beverage during the fit is tepid whey, which may be taken in any quantity: it aids the operation of the medicines on the bowels and kidneys. A weak infusion of sassafras, weak black tea, thin gruel, barley water, or other diluents, may be also used; but acid drinks should be avoided. Small quantities of the subcarbonate of potash may be added to these, and they may be rendered more agreeable by a few slices of orange or lemon peel. Grapes and ripe oranges may be likewise allowed, if they be not found to occasion flatulency or acidity. A very restricted diet in the fit has been strongly insisted upon by CELSUS, THRIVERIUS, RIEDLIN, PIETSCH, and CADOGAN, who have justly considered it an important part of the treatment; for, if nourishment be too liberally allowed, or if it be stimulating, from a mistaken notion of supporting the strength, the result will be merely the aggravation of the disease. The patient should not remain in bed for a longer period than is really necessary, but begin to use his limbs gently as soon as possible. SYDENHAM recommends that he should take exercise in a carriage even in the beginning of a fit; but this is seldom beneficial, and therefore unnecessary. An attack has been

Alii marrúbium; alii potamogetonem;
Alii urticas terunt; alii symphytum;
Alii lentes adferunt ex palustribus lectas;
Alii pastinacam coctam; alii folia persicorum,
Hyoscyamum, papaver, cepas agrestes, mali punici cortices,
Psyllium, thus, radicem elebori, nitrum,
Fœnum græcum cum vino, gyrinum, collamphacum,
Cyparissinam gallam, pollen hordeaceum,
Brassicæ decoctæ folia, gypsum ex garo,
Stercora montanæ capræ, humanum oletum,
Farinas fabarum, florem asii lapidis;
Coquunt rubetas, mares araneos, lacertas, feles,
Ranas, hyænas, tragelaphos, vulpeculas.
Quale metallum non exploratum est mortalibus?
Quis non succus? Qualis non arborum lacryma?
Animalium quorumvis ossa, nervi, pelles,
Adeps, sanguis, medulla, stercus, lac.
Bibunt alii numero quaterno pharmacum:
Alii octono; sed septeno plures.
Alius vero bibens hieram purgatur;
Alius incantamentis impostorum deluditur," &c.

* The following list of substances, although adduced satirically in the *Τραγικοδωγέα* of LUCIAN, was actually employed by the ancients in the external treatment of gout: —

“Terunt plantagines, et apia
Et folia lactucarum et sylvestrem portulacum.

prevented by determined exertion, or by a long walk; but it has also been brought on by the same cause. Dr. SMALL advises the patient to walk abroad as soon as the inflammatory action has ceased, and argues that gouty persons owe their lameness more to indolence and fear of pain than to the disease. Sir C. SCUDAMORE, however, states, that he has seen the too early exertion of the limb produce a relapse. When the pressure of the bed-clothes cannot be borne, the part may be protected by a cradle.

67. *E. Treatment during Convalescence and in the Interval.*—Treatment ought not to be relinquished with the subsidence of the paroxysm, but directed to the restoration of the healthy state of the digestive and excreting functions, and of the strength of the weakened limbs. If these ends be not attained, the patient will be liable either to protracted convalescence, or to the speedy return of the fit. During recovery, the appetite is often in a state of morbid excess, whilst the powers of digestion and assimilation are weakened. This seems to be owing to the vascular erethism of the gastric mucous surface, and requires the restraint of the physician, and the self-control of the patient. The meals should be light, and in moderate quantity. Where there is much debility, half a pint of asses' milk may be taken early in the morning, and repeated at night. Animal food ought to be sparingly indulged in; and soups, pie-crusts, pickles, and pastry of all kinds, avoided, as they generally occasion, in gouty persons, acidity of the prima via. The stomach should not be required to perform more than its strength will admit of, nor goaded to exertion by stimulating or heating beverages. Where there is a tendency to plethora or vascular excitement of the digestive mucous surface, or to congestion of the liver, or to determination to the head, this caution ought to be carefully observed. It will, however, be necessary to restore the organic functions by an appropriate use of bitters or other tonics; but these medicines should either be postponed until the secretions and excretions are restored to a healthy state, or be conjoined or alternated with means directed to fulfil this intention. Whilst the tongue continues loaded, mild purgatives or deobstruent aperients are necessary; but purgatives alone will frequently fail of removing this symptom, and restoring the healthy functions of the abdominal viscera, unless tonics are also exhibited. The state of the tongue, in these cases, frequently depends more upon the constitutional disorder and debility, than upon the state of the alimentary canal. It will, therefore, be preferable to conjoin tonic infusions with such a quantity of the infusion of senna or of rhubarb, as will act moderately on the bowels; and to these, either of the alkaline carbonates and the extract of taraxacum may be added. Craving of the appetite is to be referred to debility, or to the cause already adduced; and will generally be removed by tonics, judiciously combined with alteratives and laxatives.

68. In a large proportion of cases, the treatment during convalescence, and in the interval, should consist chiefly of a restricted diet, abstinence from wine and heating liquors, and a careful regulation of the quantity of food to the degree of physical exertion used by the patient. In tolerably sound constitutions, tonics will merely

increase vascular plethora — especially if chalybeates be employed, — unless active exercise be taken, and secretion and excretion be promoted. When there is chronic disease of the liver, or torpor of this organ, or biliary obstruction, mercurial alteratives should be given at bed-time, and an aperient draught with taraxacum early in the morning. The emplastrum ammoniaci cum hydrargyro may also be applied to the right hypochondrium and epigastrium. In nervous, irritable, or debilitated persons, the judicious use of tonics is beneficial. In many cases, the compound decoction of sarsaparilla, the mezereon being omitted, will prove gently tonic as well as alterative; but, when the debility is greater, the sulphate of quinine, or the preparations of bark, are preferable. The infusion or decoction of cinchona, or any of the other tonic infusions, may be prescribed with the alkaline carbonates, and the aromatic spirit of ammonia, and, when the stomach is irritable, with an increased quantity of the carbonates, and taken during effervescence with fresh lemon juice. When the bowels are sluggish, a compound infusion of tonics and aperients may be given in the manner I have just advised; or any of the medicines directed above (§ 50. 56.) may be used; or the compound decoction of aloes may be taken with the compound infusion of gentian, or with the infusion of cascarrilla, or with camphor julep, as recommended by Sir C. SCUDAMORE; an alterative pill, consisting of PLUMMER'S pill and soap, or of hydrarg. cum creta, the compound rhubarb pill and soap, being taken at night. — When there is no tendency to inflammatory action or congestion of the liver, debility of the digestive organs, as well as a sluggish state of the bowels, will be remedied by quinine conjoined with small doses of the purified extract of aloes, or with the aloes and myrrh pill, or with the compound rhubarb pill (see F. 575.). The following draught may be used as a stomachic aperient, and varied according to circumstances; or the pills may be substituted, and taken at dinner or at bed time, in a dose sufficient to keep the bowels freely open: —

No. 238. R. Corticis Cascarrillæ contusi 3ij.; Calumbæ Radicis concisi 3jss.; Rhei Rad. concisi ʒij. (vel Folior. Sennæ 3ij.); Semin. Coriand. contus. et Cardamom. Semin. contrit. āā 3ss.; Aquæ Ferventis 3ix. Macera per horas duas, et cola.

No. 239. R. Hujus Infusi 3xj.; Potassæ Carbon. 3ss.; Tinct. Aurantii 3j. M. Fiat Haustus, primo mane, et meridie, cum succi limonis recentis cochleare, in effervescentiæ impetu, sumendus.

No. 240. Pulv. Ipecacuanhæ gr. xij.; Pulv. Capsici ʒj.; Pulv. Rhæi ʒij.; Extr. Aloës purif. ʒj.; Extr. Fellis Bovini ʒij.; Saponis Duri ʒj.; Olei Cajeputæ ℥xx. vel q. s. M. Fiant Pilulæ xl. quarum capiat unam, duas, aut tres, cum prandio, vel horâ somni.

69. The œdema and debility of parts consequent on the fit are most marked after a relaxing local treatment, and are frequently such as to require medical aid. — Mechanical support, by means either of a calico or flannel roller, according to the warmth of the season, is generally serviceable, especially if the veins are varicose, or the ligaments weak. The surface of the parts may also be sponged, night and morning, with a strong solution of salt in water, at a tepid temperature; and having been wiped dry, friction should be applied for some time. Frequently, friction should be accompanied by the use of a stimulating and strengthening liniment, consisting of the compound camphor and soap liniments, with the ad-

dition of a little spirits of turpentine and cajeput oil; or *Formulæ* 308.311. in the Appendix may be employed.

70. *F.* The *Empirical Treatment of Acute Gout* requires merely a brief notice.—*a.* The *eau médicinale*, *Wilson's tincture*, and *Reynold's specific*, are in most general use as specifics for the cure of gout. The composition of these, however, is not certainly known, although it is generally believed that they are preparations of colchicum of different degrees of strength. Their effects are very nearly the same as those of the tincture and wine of the roots of colchicum; for they all produce, in the dose of a drachm or a drachm and a half, diminished energy and frequency of the pulse, languor, nausea, sickness, terminating either in vomiting or in alvine evacuations, and relief of pain. If the dose be the least in excess — especially in some constitutions — syncope, extreme prostration, cold sweats, violent vomiting and purging, a small feeble pulse, and alarming sinking or insensibility, are the results. *Colchicum*, when employed merely with the view of preventing, or suddenly curing, the paroxysm, and without reference to the removal of the morbid conditions of which it is the external manifestation, is liable to the same objections as are justly urged against the above secret medicines. The consequences of having frequent recourse to them vary in different constitutions, and with the habits and modes of living of the patient: but they commonly are — a much more frequent return of the fit, or of the symptoms indicating its approach; impaired nervous power; debility of the digestive organs; torpor or irregularity of the biliary functions and of the bowels; headaches, and a variety of symptoms referrible to the encephalon. — Besides these, I have met with instances of hypochondriasis, melancholy, mental delusions amounting to insanity, paralysis, and angina pectoris, evidently arising from this cause. I very recently saw a case of partial insanity, with Mr. SHUTE, occasioned by the use of Wilson's tincture on the approach of the gouty paroxysm.

71. *Veratrum*, or the white hellebore, or some unknown species of *veratrum*, was much employed by the ancients in gout; and Mr. MOORE recommended a wine of this plant with laudanum, believing it to be identical with the *eau médicinale*. Sir C. SCUDAMORE has referred to instances where it produced dangerous effects. It usually causes irritation of the stomach, with a distressing sense of heat, white tongue, thirst, and nervous depression; and, in a larger dose, severe vomiting and purging, with griping pains, and distressing sinking of the vital powers. In the more moderate doses in which it is prescribed, its effects are not so severe, but then it frequently fails of having any control over the symptoms. — The *Gratiola officinalis*, or hedge hyssop, and the *Ranunculus flammula*, have likewise been employed; but they deserve little credit. A tincture of the former, however, has been said to produce effects similar to the *eau médicinale*. They are both very active irritants of the digestive mucous surface, and produce purgative and emetic effects. — The *Elaterium* has been given by Mr. GREEN, in the infusion of senna, with a few drops of laudanum. It has generally produced slight vomiting, and copious alvine evacuations, and speedily removed the fit. — He recommends flannel, fleecy

hosiery, &c. to be laid aside, and leeches to be applied, when much inflammation exists in the affected part. — The *Ballota lanata* has been employed by PROFESSOR BRERA in the form of decoction — half an ounce of it being boiled in a pint of water down to half a pint, which quantity is to be taken daily. It appears to promote the secretions and excretions.

72. *Various other active Medicines* have been employed with the view of removing the fit. Some of these are extremely powerful, and require much caution; others have little influence. The *Rhododendron chrysanthum* has been prescribed by HOFFMANN, KOELPIN, BUZOW, PALLAS, WEISMANTEL, and METTERNICH. It is used principally in the northern countries of Europe; and, when carefully exhibited, is a medicine of no mean efficacy, especially in the more chronic states of the disease. The decoction of *Solanum dulcamara* has been recommended by CARRÈRE, WANTERS, and PRESSAVIN; the decoction of the *Sambucus*, by FREITAG, BLOCHWITZ, and GARDANE; the *Erigeron Philadelphicum*, by BARTON; *Digitalis*, by HOFFMANN and GAPPER: the decoction of the *Ilex aquifolium*, by FRIZE, REIL, DREYSIG, and BANDELOW; and the decoction of the *Hedera terrestris*, by De HEIDE and CARTHEUSER. Of these, the *sambucus* seems most deserving of use, the berries and bark being the most active parts.

73. The above substances act energetically upon the digestive mucous surface, and promote the secretions and excretions; but, when exhibited in large doses, they also inflame this surface, impair the organic nervous energy, powerfully affect the brain and the rest of the cerebro-spinal system, and lower the sensibility. They should, therefore, be given with great discrimination and caution. Where the powers of the constitution are materially weakened, and the organs of digestion in a state of irritation, they ought not to be employed. Their influence on the paroxysm is chiefly to be attributed to the above modes of operation — to the copious evacuations they procure from both the liver and digestive mucous surface — and partly to their action on the nervous system.

74. *b.* The *Portland gout powder* once had great reputation for preventing the return of the fit. It consists of the roots of birthwort, and of gentian, and of the tops and leaves of germander, ground-pine, and centaury. These are well dried, powdered, and sifted, and mixed together in equal weights; a drachm being taken every morning fasting. Dr. CLEPHANE has instituted a learned inquiry into the origin and use of this powder. Having continued this quantity for three months, a dose of three fourths of a drachm is given for another three months, and half a drachm afterwards for six months. This medicine differs but little from some mentioned by GALEN, CÆLIUS AURELIANUS, AËTIUS, and others of the ancients; and which appear to have been brought into notice for a time, and then to have fallen into neglect, owing to their pernicious influence. Indeed, CÆLIUS AURELIANUS remarks, that he has seen gouty persons, who frequently used bitters, carried off by apoplexy; and the same remark is made by BOERHAAVE and QUARIN. Dr. CULLEN states, that where the Portland powder has been long used, the external manifestation of gout was not ob-

served; but symptoms of atonic gout, or apoplexy, or asthma, or dropsy, supervened. He remarks, that the prevention of the disease depends much on supporting the tone of the stomach, and avoiding indigestion; that costiveness, by occasioning this latter, is hurtful and should be avoided; and that much purging is injurious.—The aperients he recommends are, aloes, rhubarb, magnesia, and precipitated sulphur, as they may suit particular cases.—*Sulphur* is recommended for the prevention of the fit by TULPIUS, RULAND, GRANT, GARDINER, and QUARIN. HUFELAND advises it to be conjoined with guaiacum, in a quantity sufficient to act moderately on the bowels. There is no doubt of sulphur and magnesia being both safe and efficacious, in preventing the return of the disease, when aided by suitable diet and regimen.

75. *c. Chalybeates* have been considered as extremely efficacious in preventing the fit, especially when conjoined with the alkaline subcarbonates, and when the bowels are kept open during their use. The preparations of hop are also of service; but they require, equally with chalybeates, quinine, and other tonics, an abstemious and temperate diet, and exercise in the open air. Of tonic, stimulating, and heating medicines, given with the view of preventing the paroxysm, it may be stated, that they are dangerous in the plethoric and robust, inasmuch as they increase vascular fulness and action; and that, if they be resorted to, in such persons especially, abstinence, and the free action of all the emunctories, should be observed. In some cases—particularly in nervous, irritable, and delicate constitutions—a moderate quantity of wine, or either of the tonics in most common use, as the preparations of cinchona, or of the aromatic or bitter substances, or of iron, or of hop, &c., is almost indispensable; but the use of purgatives and the rest of the treatment should also be enforced.

76. *ii. Treatment of Chronic Gout.*—This state of disease has been shown to occur either primarily, or consecutively on the acute.—*A.* In the former case, the powers of the constitution are insufficient to produce the disease in a sthenic form; and either the nervous, or the lymphatic, or phlegmatic temperament, is generally predominant. The indications of cure should be founded upon a careful estimate of the condition of the several functions, especially those concerned in excretion. Vascular plethora is seldom present in such a degree as to require general depletion. The imperfect performance of the digestive, assimilating, and excreting functions, and defective nervous power, indicate the employment of medicines calculated to increase these functions. When the biliary secretions are scanty or obstructed, a full dose of calomel, of camphor, or JAMES'S powder, and hyoscyamus, may be given at bed-time, and a purgative draught at an early hour in the morning. To these may be added, during the day, saline, aperient, and diuretic medicines, with an alkali, or magnesia. It will frequently be necessary to soothe nervous irritation by the exhibition of a narcotic. The preparations of opium, especially DOVER'S powder, or morphine conjoined with camphor or aromatics, will generally give relief, especially after morbid secretions and excrementitious matters are evacuated. But they constipate the bowels; the other narcotics may

therefore be tried. It will, however, be found frequently preferable to continue the opiate, and to obviate its effects by one of the stomachic aperients prescribed above, taken early each morning.

77. Tonics, and heating or stimulating medicines, tend rather to fix than to remove the disease; and are always injurious, if excrementitious matters have not been carried off. An alterative and aperient pill, as the hydrargyrum cum creta, Castile soap, and extract of taraxacum; or PLUMMER'S pill, with either of the same adjuncts; may be taken at bed-time, and a small or moderate dose of any of the preparations of colchicum in the morning and at mid-day, with any of the stomachic aperients as prescribed above (§ 50. 68.).—In this form of the disease especially, the spiritus colchici ammoniatus is a useful medicine. But either of the other preparations may be used, conjoined with magnesia, or with any of the alkaline subcarbonates, and with saline or stomachic aperients. Sir C. SCUDAMORE recommends a draught with compound tincture of benzoin and magnesia to be given once or twice a day, or the compound decoction of aloes, with an equal proportion of the infusion of cascarrilla or of gentian. When the secretions are restored to a healthy state, and debility of stomach with general depression is the principal ailment, gentle tonics, aided by suitable diet, and moderate exercise in the open air, are necessary; but a too full and stimulating diet, or heating regimen, should be avoided. In the summer and autumn, the warm sea bath, twice or thrice a week, will be serviceable.

78. *B. Chronic gout consequent upon the acute*, especially after repeated invasions of the latter have impaired the constitutional powers, is generally attended by obstinate disorder of the digestive and excreting functions, with more or less disturbance of the nervous system. Vascular plethora is oftener present in this variety of chronic gout, than in the preceding; and the local affection is readily increased by the internal use of stimulants; but alterative aperients, conjoined with colchicum and diuretics, as just recommended (§ 77.), will generally be efficacious. When the bowels are very torpid, the purgatives mentioned above (§ 50. 54. 56.) should be given in such doses as may be sufficient. Sir C. SCUDAMORE advises the addition of guaiacum to the purgative in such cases; and, when little or no fever is present, it will prove beneficial. If congestion exist in the liver, head, or kidneys, cupping will be necessary. When pain in the stomach, or tenderness in the epigastrium, is complained of, leeches applied on this region, and followed by a rubefacient epithem, or blister, will be requisite. If the urine be scanty, high-coloured, and thick, cupping over the kidneys, and the use of active diuretics, will be of great service. Besides the saline substances already noticed, small doses of turpentine, or a decoction or infusion of the pine sprouts or tops, as directed by BARTHEZ, may be given at short intervals; or the preparations of juniper, or the sweet spirits of nitre, may be added to saline and alkaline medicines. When the liver continues torpid, or the bile deficient, and the urine thick, the compound calomel pill, with soap, should be given at night, and the extract of taraxacum added to the medicine prescribed during the day.

79. Having removed the more urgent phenomena, the treatment should be directed to the restoration of the healthy actions of the emunctories, and of the digestive organs, as insisted on with reference to the other states of the disease.—But unless an abstemious diet and temperate regimen be observed, and be aided by regular exercise in the open air, disorder of these organs will soon return, and the gouty affection afterwards reappear.—When the nervous system has become very susceptible, and the parts affected more or less changed in structure, the object, after the removal of the internal disorder, is to invigorate the nervous system, and restore the parts as far as possible to the healthy state. Unless this end be accomplished, so as to allow the patient to take sufficient exercise, recurrence of the disease can hardly be prevented; and, although the digestive and excreting functions may be preserved in a healthy state, the affection will assume more or less of a rheumatic character; or rheumatism will be associated with it; and the patient will be injuriously impressed by every change of weather, and by every exposure. Where this state of disorder occurs, small doses of DOVER'S powder, either alone or with camphor, and a judicious recourse to aperients with tonics, will prove beneficial. *Sulphur*, either alone or with guaiacum, as recommended by HUFELAND; and the compound decoction of sarsaparilla, with the *liquor potassæ*, or with *hydriodate of potash*, or with both, aided by the external applications about to be mentioned, will also be serviceable in these cases.

80. *C.* The local treatment in chronic gout should claim attention as soon as the more urgent disorder subsides.—*a.* The vapour bath frequently increases the weakness of the parts; but sponging the surface with a strong tepid solution of salt in water, is often of service.—*Frictions* with slightly stimulating liniments, as the compound camphor, and compound soap, liniments conjoined, are generally beneficial; and to these may be added, in the more indolent cases, spirits of turpentine and cajeput oil. Frequent or continued frictions are of the greatest benefit, and should be employed in the intervals between the use of liniments. When oedema remains, and the sensibility of the parts has subsided, the tincture of *iodine* may be applied over the surface with a camel-hair pencil.—*Electricity*, especially sparks drawn from the part, has been advised in such cases by QUELMALZ, NEIFELD, SCHAEFFER, BAUMER, DE HAEN, VOGEL, and SIGAUD LA FOND; and *galvanism*, by WALTHER and BISCHOFF. Of the efficacy of these, however, I can give no opinion. Suitable support of the parts by bandages, or by laced stockings, is generally of service. Of the use of mineral baths, &c., mention will be made in the sequel. But whatever external means are employed, ought to be preceded and accompanied by internal treatment, otherwise little permanent advantage will accrue; or even the external affection may be thereby merely suppressed, and internal disease either produced or increased.

81. *b.* The *gouty concretions* are seldom removed even by the aid of external treatment. Mr. MOORE states, that pressure ought not to be applied to them; and that their removal by the knife should not be attempted. He, however, admits that a small puncture of the cuticle may be

made, and that caustic may be applied when they have penetrated the cutis. The application of cajeput oil was recommended by HUFELAND and ABRAHAMSON; but it is more advantageously used with the spirits of turpentine and the compound soap liniment. J. P. FRANK advises soaps rendered emollient in almond or other oils, with the addition of camphor. Sir C. SCUDAMORE directs the liquor potassæ, diluted by an equal quantity of almond milk, to be rubbed over the part twice or thrice daily; and calcined magnesia and liquor potassæ to be given internally in almond emulsion, or in any other vehicle suggested by the state of the internal functions. It is necessary, however, that this plan should be persevered in, and that the functions of the stomach and liver should receive strict attention. Regular exercise in the open air ought also be taken, as advised by SYDENHAM, and found beneficial in his own case.

82. *iii. Treatment of Irregular Gout.*—I have shown above, that gouty affections may be irregular in three different ways.—(*a*) The precursory disorder may be of an irregular, prolonged, or unusual character, and ultimately be followed by the external affection;—(*b*) or the disease may commence in its usual manner, suddenly disappear, and affect some internal viscus;—(*c*) or it may seize at once upon some internal organ, and either exhaust itself, or be remedied by treatment without any external affection appearing in its course, or it may destroy the patient.—The *first* and *third* of these varieties require the same treatment, modified according to the character and seat of the internal affection. I shall therefore consider, in the first place, the means most appropriate to the disorders connected with the retrocession or suppression of the external affection.

83. *A. Retrocedent Gout.*—In no disease is discrimination, on the part of the physician, more necessary than in this; for upon the inference that is formed as to the existence of inflammation or of spasm, and as to the degree in which either is present, the life of the patient depends.—*a.* In nervous and weak constitutions, a *spasmodic* or *nervous character* is generally predominant, as indicated by the weak, or irregular, or unaccelerated pulse, and by the ease derived from pressure, &c. In these, energetic stimulants or antispasmodics, with anodynes or narcotics, or even warm brandy and water, are required. In other cases, a mixed affection, or a state of congestion, may be inferred; and in them, the remedies just mentioned may not be injurious, but additional means are required, especially alvine evacuations, external derivatives, or even local depletions. When the retrocession appears to have been caused by indigestible matters, an emetic should be exhibited, conjoined with a warm cardiac, as capsicum, ammonia, or camphor; and if nausea and vomiting be present, a full operation should be procured by warm water, or by the infusion of chamomile flowers. If the stomach or bowels are principally affected, a full dose of calomel, with camphor, hyoscyamus, or opium, should be given; and, two or three hours afterwards, one of the purgative draughts already prescribed, which should be aided in its operation by a cathartic enema containing turpentine, assafoetida, or camphor.—If suffering

still continue, the calomel, camphor, and opium may be repeated, after an interval short in proportion to the severity of the case; the feet should be plunged in hot water to which a large quantity of mustard flour and salt are added, or be enveloped in sinapisms; and flannels wrung out of very hot water, and soaked with spirits of turpentine, should be applied over the abdomen; or croton oil rubbed over the stomach. Sir C. SCUDAMORE directs the saline draught with colchicum to be given and repeated; but I doubt the propriety of giving this medicine in cases of consecutive gouty affection of the stomach or intestines.

84. *b.* Although the internal affection will often assume a nervous or spasmodic character—especially in the constitutions mentioned in connection with it, and at the commencement of the seizure, before vascular reaction has taken place—yet *active congestion* or *inflammatory determination* is not infrequent, particularly in more plethoric and irritable habits.—Much care and discrimination are required to ascertain the presence or absence of these states; and either is to be inferred chiefly from the causes of retrocession, from the state of the pulse and of vascular repletion, and from the tenderness, fulness, or tension, and temperature, of the regions containing the affected organ. The patient's sensations, and the symptoms connected with the excreting functions, ought also to be carefully estimated. If, from these, *inflammatory action* of the stomach, intestines or kidneys be inferred, bloodletting, according to the strength and habit of body of the patient, must be promptly put in practice. But vascular depletions are neither so well borne in such cases, nor so successful, as for inflammations occurring primarily, or in previously healthy persons. The amount and repetition of depletion must depend entirely upon the circumstances of the case; but, in every instance, depletion should be aided by the derivatives and hot epithems just recommended. A full dose of calomel, with a few grains of camphor, and two of opium, should also be administered, and repeated within two or three hours, if indications of relief are not observed. After one general bloodletting, local depletion by cupping or leeches may be employed, and repeated in severe cases, or in plethoric persons. In some instances, the powers of the circulation can bear only local depletions.—When much flatulent distension, and severe colicky pains, either attend the internal seizure, or remain after the above means are employed, equal parts of oil and turpentine and of castor oil (3 iv. to 3 vj. of each) may be given on the surface of an aromatic water, with or without a warm tincture, or aromatic spirit; and an enema containing the same oil may be administered a few hours afterwards, to promote its operation.

85. *c.* The internal attack, although nervous or spasmodic at its commencement, may become congestive, or even inflammatory, as vascular reaction supervenes. This fact should not be overlooked; for the seizure that is benefited by stimulants at the beginning, owing to this circumstance, may require depletions in its progress. The internal affection may even present a *mixed character*—one in which it is difficult to determine whether the nervous, or the spasmodic, or the congestive, or the inflammatory symptoms predominate. In these cases, it will be necessary

to have recourse to antispasmodics and narcotics or anodynes, whilst vascular depletions and evacuations are being employed.—Having treated several cases of retrocedent gout, and being thereby induced to observe closely, and to reflect upon, the phenomena attending it, and the effects of the treatment adopted, I am morally convinced, that exclusive views as to either the nervous or the inflammatory character of the internal affections, are incorrect; and that it requires the utmost acumen on the part of the practitioner to discriminate between these states, and to detect their varying shades. In the more spasmodic forms of these affections, especially when implicating the stomach, opium and camphor are most valuable remedies; but I have seen great benefit also accrue from hydrocyanic acid given in repeated doses with camphor and aromatics.

86. *d.* When the consecutive seizure is experienced in the *heart* or *lungs*, the same principle of practice should be observed. When the *heart* is affected, the restlessness, anxiety at the præcordia, and alarm of the patient, are most distressing. I have lately seen two cases of this kind. In both, the action of this organ was frequent, irregular, fluttering and weak; in one, it intermitted every fourth beat, the three intervening strokes being successively weaker. In both these I am convinced, from the character of the symptoms, that depletions would have caused a fatal result. Camphor and opium, with aromatics and external derivatives, were prescribed for both, and in a few hours the affection was removed. In the cases also referred to above (§ 19.), this and similar modes of practice were equally beneficial.

87. *e.* When *apoplectic*, *epileptic*, or *convulsive* seizures follow the retrocession of gout, vascular depletion is frequently requisite, especially in apoplexy. But, even in it, discrimination is imperatively called for. If the head be cool, and the action of the carotids weak, an entirely opposite treatment to depletion is required.—In the *epileptic* or *convulsive seizures*, depletions are often unnecessary, and sometimes injurious. Even when manifestly indicated, they require much caution, and ought not to be prescribed in large quantity. In both the apoplectic and epileptic attacks, purgatives, and cathartic enemata, energetic derivation to the lower extremities, and camphor, are beneficial; but narcotics should be withheld, especially in the former, although, when conjoined with antispasmodics and cardiacs, they are sometimes of service.—When the retrocession of gout has been caused by cold, vascular depletion is more frequently useful, than in other circumstances; but the utmost caution is necessary as to the extent to which it is carried. Derivations by sinapisms, mustard pediluvia, croton oil, &c., however, ought to be most actively employed.

88. *f.* If the *kidneys* or neck of the *bladder* are affected upon the retrocession of gout, the treatment will depend entirely upon the concomitant phenomena. If the urine be suppressed, or pain or tenderness be felt in the region of the kidneys, or numbness in one or both thighs, cupping on the loins, followed by a blister in the same situation, will be requisite; but the latter should be removed after a few hours, or sinapisms substituted.—Derivation to the lower extremities, and small doses of camphor internally, with diuretics,

ought also to be prescribed.—Where the neck of the bladder becomes affected, leeches applied to the perineum, the semicupium, and the internal use of alkalies, with camphor and anodynes, or with mucilaginous and diuretic medicines, should be employed.

89. *B. Misplaced Gout* (§ 21.), or those severe affections of internal organs which threaten the life of the patient, and are either followed by the regular disease, or run their course without any external affection, although occurring in persons who have previously had gout, must be treated very nearly according to the principles stated above. If vascular depletion require cautious discrimination in retrocedent gout, it still more imperiously demands it in cases of this kind.—*a.* Any internal organ may be the seat of misplaced gout, or in other words, the internal viscera are disposed to severe disorder in gouty constitutions; but the stomach, bowels, heart, brain, and kidneys are most frequently affected. Gouty persons are often affected by spasms of the stomach and colic, after exposure to cold, or after partaking of cold, acid, or improper food. For these cases, large draughts of warm water, and stimulant and cardiac medicines, or warm brandy and water, are suitable means. In some, the disorder alternates between the *stomach* and *heart*; or the flatulence attending upon the affection of the former, induces palpitation or otherwise disordered action of the latter, with inexpressible anxiety. A gentleman who had suffered attacks of gout, but had escaped them for some years, was subject to disorder of the stomach, to severe headaches, and to alarming and sudden affections of the heart, the action of which was fluttering or tumultuous; and the anxiety and suffering referable to it, most distressing. He was lately seized with one of these attacks at a party. He was assisted into his carriage, and was brought to my house after midnight. The affection approached the characters of angina pectoris, but I inferred its aggravation by flatulence: I therefore prescribed a warm carminative medicine. Whilst this was being procured, I directed the patient to swallow a few of the small pods of capsicum. Flatulent eructations and instant relief were the consequences. In a few minutes afterwards he walked unaided to his carriage.

90. A gentleman well known in the profession had some years ago experienced imperfect manifestations of gout in the lower extremities, connected with affection of the digestive organs. Recently after a severe domestic affliction, he was seized with distressing disorder of the stomach and heart, with anxiety, alarm, and nervous irritation. Dr. Roors and myself agreed as to its nature; and prescribed anodynes with antispasmodics, aromatics, and alkaline subcarbonates. The excretions received due attention, and external derivatives (§ 83.) were employed. Whilst improving under this treatment, he was suddenly affected by an alarming increase of the disorder of the heart. His pulse had become weak, irritable, and intermitting; the impulse of the heart was feeble, but unaccompanied by any anormal sound; his countenance was expressive of distress; and he was constantly changing his position. A draught, containing two drops of hydrocyanic acid with camphor, aromatics, and capsicum, was prescribed, and repeated in an hour,

and derivations by sinapisms resorted to. He obtained relief in a few hours, and continued improving for two or three weeks afterwards; when he had a second attack in the night, for which camphor and ammonia, with opium, were given him, and carminatives with magnesia. He was immediately relieved, and has continued afterwards to improve; the subsequent treatment consisting of a combination of anodynes and restoratives, and of stomachic aperients.

91. *b.* When apoplectic or epileptic seizures, or diseases of the kidneys or bladder, thus occur in persons who have previously had fits of gout, the treatment should be guided according to the principles just developed.—*Apoplectic* and *paralytic attacks* are very common in gouty persons far advanced in life, and who have been long without a regular paroxysm. In these, depletions are not so generally beneficial as in other circumstances, although they are often required; the energetic exhibition of purgatives and of cathartic enemata, and the application of sinapisms to the feet, &c., being much more generally appropriate.—When *epilepsy* or *convulsions* appear in gouty persons, depletions are hazardous; antispasmodic and purgative enemata and derivation being much more useful. Whatever organ becomes diseased in such persons, the treatment must be guided by the state of the pulse, the signs indicating the nature of the complaint, and the age and strength of the patient; for although large depletions may be necessary in some cases, yet they will certainly destroy the patients in others, although the disorder and its seat are apparently the same. When the disease presents unequivocally inflammatory characters, or when the patient has been highly fed, or is plethoric and robust, bloodletting cannot be dispensed with; the question being, as to the extent to which it should be carried; and, as to this, the practitioner must decide for himself, and be guided by the peculiarities of the case. In the gouty constitution especially, it cannot be trusted to alone, or even principally, unless in robust and plethoric persons.—When apoplexy is *complicated* with gout, the former occurring during the paroxysm, or without the disappearance of the latter, bloodletting and alvine evacuations should be prescribed with an energy suitable to the circumstances just adverted to. Such cases are, however, comparatively rare.—I have never known of an instance of epilepsy whilst the gouty paroxysm continued, although I have seen it take place upon the retrocession of the fit, and in gouty persons. VAN SWIETEN remarks, that, in cases in which he has seen an epileptic seizure in the gouty, the occurrence of a regular paroxysm of gout has prevented a return of the epilepsy.

92. *c.* As to the employment of *colchicum* in cases of retrocedent or misplaced gout, recent writers have stated nothing in which the practitioner can confide. When the stomach is weak, the nervous power depressed, and the pulse irritable, it is generally injurious: when inflammatory seizures occur, either upon the sudden disappearance of the external affection, or in the gouty constitution, it may be employed: and the advantage proceeding from it will be in proportion to the degree of sthenic action indicated by the pulse. Yet cases will sometimes occur, in which this medicine cannot be endured, although indi-

cations of vascular fulness and of increased action are present. A gentleman of regular habits, and of a full and large make, had the consequences of chronic gout in his lower extremities, but had not experienced a regular paroxysm for some years. My attendance was required on account of determination of blood to the head. The excretions were free, bilious, and natural. Desirous of removing the disorder by active alvine evacuations, I conjoined small doses of colchicum with the purgatives; but they occasioned a distressing sense of sinking at the epigastrium, and nausea. I soon afterwards found that depletion could not be dispensed with; and nearly thirty ounces of blood were taken from the nape by cupping, without any tendency to syncope; and he soon recovered.—In all cases of doubt, this medicine should be prescribed in small doses, which may be increased; but, as with digitalis, an accumulating effect may result; and it ought to be carefully watched. When, however, increased vascular action exists, in the irregular forms of the disease, it may be cautiously used.

93. Dr. BARLOW remarks, “that the complex conditions and alleged varieties of gout are referrible not intrinsically to gout, but to the state of constitution in which it occurs.” This is all that is meant; for no modern pathologist intends to convey any other idea than that internal affections supervening in that state of constitution which occasions gout, are generally more or less modified by this circumstance. It is to the improvement of this state of constitution, that treatment should be directed; and, after arriving at rational inferences as to its nature, the means of cure will readily suggest themselves.—Having seen that the constitution or diathesis, which has been called gouty, in order to prevent circumlocution, consists in debility associated with imperfect secretion and excretion, and consequently with fulness of blood or with redundancy of excrementitious matters—the ultimate products of assimilation in the circulation—the treatment should obviously be directed with reference to the predominance of either of these states. Although what has generally been called misplaced gout, may thus be viewed as internal affections occurring in the gouty diathesis, and although they sometimes present little deviation from those appearing in other circumstances, yet a very remarkable difference is often observed—the symptoms being very different, and often peculiar, and the *juvantia* and *lædientia* being also different.—The predominance of debility and spasm in many of these affections induced SPRENGEL, CULLEN, and SCHMIDTMANN to prescribe *musk* for them; and the success of the treatment is a presumption of the justness of their views, at least in respect of the cases in which it was employed.—In addition to other stimulants and antispasmodics successfully resorted to in similar circumstances, most of which have been noticed above, I may state, that a solution of *phosphorus* in ether has been advised by TRAPPEL and HUFELAND; *aconitum* and *nux vomica*, by STOERCK, myself, and others; the spirits of *turpentine*, by THEODOSIUS and GOOD; and large doses of *olive oil*, by BREFALD, MARINO, and MALACARNE. If turpentine, however, be resorted to, castor or olive oil should be given with it, in a quantity sufficient to produce a full operation on the bowels; and

the same combination ought to be administered as an enema, in order to promote this effect. Neither of these substances, however, nor camphor, ammonia, ether, opium, nor any of the other stimulants and antispasmodics previously mentioned, should be confided in alone, or unaided by active and persevering external derivation.

94. iv. *Of Mineral and Thermal Waters in Gout.*—Mineral waters are beneficial—1st, by preventing a return of the paroxysm; 2dly, in cases of a tonic and misplaced gout, by giving tone to the digestive and assimilating functions, and thereby either removing the internal affection, or enabling the system to develop the disease in the extremities.—*a.* Respecting the *Bath waters*, Dr. BARLOW makes several very judicious observations. In gouty cases, he remarks, especially where the stomach is very weak, and requires some substitute for the wine and stimulants relinquished, the Bath waters give tone to the stomach, improve appetite, and renovate strength. They thus accomplish unequivocal good, not by the mere establishment of gout in the extremities, but by reducing it to its simpler and more manageable state through the amendment effected in the general health. In general, it may be inferred, from what has been written on Bath waters in gout by FALCONER, GIBBES, BARLOW, and SCUDAMORE, that they are either injurious or of little service, where plethora, disease of the liver, or determination to the head exists, and that these states should be removed before they are resorted to; but that they are of service in debilitated, nervous, and irritable habits; and for those anomalous or internal affections frequently attacking gouty constitutions. When these affections occur in weak and nervous persons, and are unconnected with plethora, or active visceral disease, the internal and external uses of these waters are beneficial, especially if due attention be paid to the excreting functions.—When gout has debilitated the limbs, and weakened the constitution, so that the nervous system is depressed, and the circulation languid, a course of warm sea-bathing, with frictions of the weakened limbs, and sea air, may be tried, or may precede the use of the waters of Bath or Buxton.—Where swellings are seated in the vicinity of the joints, the Buxton baths, or pumping of the Buxton waters on the affected parts, are generally serviceable, especially if proper friction and shampooing be used immediately afterwards.—*b.* Sir C. SCUDAMORE observes that the waters of *Cheltenham* prove highly beneficial to gouty persons, particularly when conjoined with alteratives and proper regimen. When the precursory symptoms are tedious, or assume the form of what is usually called misplaced gout, their stimulating properties often excite a paroxysm, but it is generally slight. The water No. 4. seems most suitable to gouty patients, especially at the commencement of a course of these waters.—*c.* The waters of *Leamington* and *Harrowgate* are not much inferior to those of Cheltenham, when they act sufficiently on the bowels, or when their operation is aided by aperients. They seem, however, in the circumstances just alluded to, to have considerable influence in exciting a fit of the disease.

95. *d.* The artificial mineral waters at Brighton, especially the *Seidschutz*, the *Marienbad*, the *Ems*, and *Carlsbad* waters, may also be employed

in the more chronic or misplaced states of the disease.—The waters of *Wiesbaden* are much used, both internally and externally, in atonic or misplaced gout, as well as others of the *Nassau* springs; but they are not superior to the mineral waters of our own country.—*e. PISO*, *ZECCHIUS*, *BAGLIVI*, and *SAUNDERS* consider the warm mineral waters recommended in gout as little superior to common pump water heated to the same temperature. They advise from half a pint to a pint of common water, of a temperature from 90° to 114°, to be taken, and succeeded by moderate exercise every morning before breakfast. *Dr. SAUNDERS* states that, in anomalous gout, it allays the irritation of the stomach, and diffuses a generous warmth in the extremities; and that, if taken at night, it conduces to sleep.

96. v. The *Prevention of Gout* consists chiefly in the careful avoidance of the predisposing and exciting causes, and of acidity of the *prima via*. An abstemious diet, and a small quantity of animal food, are requisite. Some writers, as *STARK*, *REDI*, and *LOBB*, recommend the adoption of vegetable food only; but this restriction is not necessary. Temperance is equally important: unless it be strictly observed, no other means of prevention will be permanently of service. Regular exercise on foot, or on horseback, so as to promote the excretions, is likewise beneficial. Moderation of all the passions and affections of the mind, and avoidance of too intense or prolonged mental application, have been insisted on by most writers; the latter especially by *SYDENHAM* and *GOOD*. If abstinence, however, be adhered to, and moderate exercise be taken, mental application is seldom injurious.—Flannel clothing next the skin, by promoting the excreting function of this surface, is very serviceable. All vicissitudes of temperature, and exposure to cold, wet, humidity, or changeable weather, ought to be avoided. The feet should be kept dry and warm; and, with the legs and knees, be sponged every morning, as advised by *Sir C. SCUDAMORE*, with a strong solution of salt in water, of a tepid or slightly warm temperature. If the limbs be weak, pained, or the parts thickened, frictions may be afterwards used. *DESSAULT* directs the limbs to be well rubbed night and morning with the hands covered with strong worsted gloves, and states, that a man at seventy had gout; was cured, and remained free from it ever after, owing to this practice, although he lived to 100 years. *Sir W. TEMPLE* says, that no man need have gout, who can keep a slave to rub him. Cold bathing is hazardous for gouty persons, unless active frictions be employed immediately afterwards; but tepid or warm salt-water bathing is useful. Of the kind of food most serviceable in gouty cases, little further need be stated, than that the easiest digested is the best. Rich dishes and sauces, acids and pickles, pastry, heavy puddings, much butter, and the richer kinds of fish, as salmon, &c., should be shunned.

97. The medical means of prevention have already been noticed (§ 67.). They consist chiefly of medicines calculated to promote the secretions and excretions, and restore nervous energy. Means producing this latter effect only are injurious if they be not conjoined, or alternated, with those causing the former.—*Magnesia* has been much employed as a prophylactic, and

is amongst the medicines that can be employed, either alone or with rhubarb. Its daily use has been dreaded, since *Mr. BRANDE* published the accounts of two cases, in which it formed concretions with the mucus of the intestines. But this occurrence is very rare; and, if more active purgatives be occasionally employed, not likely to occur. Lime water and the alkalies have also been prescribed as prophylactics; but the alkalies, when continued long, weaken the stomach and relax the digestive mucous surface. The use of a dinner pill such as I have directed above (§ 68.), or prescribed in the *Appendix* (F. 562.), is more safe, and is generally beneficial.

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GRAVEL. See URINE, &c.

HÆMORRHAGE.—SYN. Αἱμορραγία (from αἷμα, blood, and ῥήγνυμι, I break forth), Αἱμορροία (from αἷμα, and ῥέω, I flow), Gr.—Sanguinis Profluvium, Sanguifluxus, Auct. Latin. Hæmorrhagia, Sauvages, Cullen, &c. Hæmorrhæa, Swediaur, &c. Cauma Hæmorrhagicum, Young. Profusio, Linnæus. Hæmorrhagie, Flux de Sang, Fr. Das Bluten, Blutfluss, Germ. Emorragie, Flusso di Sangue, Ital. Hæmorrhagy, Bleeding.

CLASSIF.—1. Class, Febrile Diseases; 4. Order, Hæmorrhages (Cullen). 3. Class, Sanguineous Diseases; 4. Order, Cachexies (Good). II. CLASS, III. ORDER (Author, in Preface).

1. DEFIN.—The discharge or escape of blood from the vessels or channels in which it circulates in the healthy state of the body.

2. Hæmorrhage may take place from the heart, the arteries, the capillaries, or veins, in consequence of disease or of external injury. It may proceed from the capillaries without any obvious lesion, excepting an almost inappreciable dilatation of them; or from the vessels formed in adventitious productions, as from fungoid, carcinomatous, and erectile tumours. It is more or less intimately connected with, and even dependent upon, the state of vital power and of vascular action, and upon local or general plethora, especially when proceeding from capillary vessels.

3. Although the definition given above comprises all the various kinds of hæmorrhage, yet I will confine myself to the consideration of those states of it which fall more especially under the cognisance of the physician. Whenever the red particles of the blood escape from the vessels to any very evident amount, hæmorrhage may be said to exist: and this inference is admissible in whatever situation the extravasation takes place—whether on mucous or serous surfaces, in the parenchyma of organs, or in any of the compound structures of the frame. All parts of the body may become the seats of hæmorrhage, excepting those which are extremely dense, as the bones, cartilages, ligaments, tendons, &c.

4. Although hæmorrhage may take place from any part of the circulating system in consequence of injury or of disease, yet it oftenest proceeds from the minute vessels distributed in mucous or serous membranes, or in the parenchyma of organs, as an exhalation or exudation from their extremities or pores. Before the time of MORGAGNI, as M. CHOMEL has remarked, it was ascribed to the rupture of a blood-vessel; and the same doctrine was very generally received until BICHAT and LAENNEC confirmed the views of this celebrated pathologist. Cases, however, often are met with, in which it is very difficult to determine whether the hæmorrhage proceeds from exhalation or from a ruptured or diseased vessel; and, even on inspection after death, the most intimate examination is requisite to the ascertaining of its source.

5. The discharge of blood from capillary vessels, in the form of exhalation or exudation, has been very generally viewed as depending upon a state of those vessels different from that which constitutes inflammation. This doctrine has been recently controverted, particularly by LÉFEBVRE and BROUSSAIS; and the following points, in which hæmorrhage closely resembles inflamma-

tion, have been adduced in proof of their very intimate connection, if not of their identity: they both very frequently arise from the same predisposing and exciting causes; both are idiopathic or primary, and symptomatic or consecutive; both are either sthenic or asthenic, acute or chronic, active or passive; they both affect chiefly the same organs; and both require the same treatment. Notwithstanding these resemblances, hæmorrhage is far from being the same disease as inflammation, as will appear in the sequel (§ 13. 15.).

6. In a great majority of instances, hæmorrhage is merely a symptom, contingent upon a variety of affections, the primary ailment being chiefly important to the physician. This is the case, no less when it takes place as an exhalation from mucous surfaces, as when it occurs from disease of the vessels, or into serous cavities, or the parenchyma of organs.—If we enter into an analysis of the pathological relations of hæmorrhages, we shall find that, in comparatively few cases, are they strictly primary or *idiopathic*. This term, therefore, must have a relative acceptance as regards them. Even when proceeding from the capillaries of mucous surfaces, and when perfectly independent of organic lesion of the vessels or of that surface, hæmorrhage is a consequence of antecedent changes; and it is indispensable to the due consideration of the subject, that the nature of these changes should be understood. They may be referred to four general heads; namely—1st. To the states of organic nervous power and vital action;—2d. To the state of structure in which the hæmorrhage takes place;—3d. To the state of the circulating organs and vessels;—4th. To the conditions of the blood;—and, 5th. To any two or more of these conjoined.

7. i. *Of the States of Organic Nervous Power, or Tone, and of Vascular Action, in Hæmorrhages.*—Although nervous power may be either excited or depressed in the seat of hæmorrhage, it is rarely the former, even when vascular action is increased, unless an irregular distribution or determination of it to the part take place, from its suppression in some other situation, or from local irritation. Vascular action, however, is much more frequently increased than depressed, not only in the part, but throughout the system; and this increase is generally much above the state of organic nervous power or tone. Owing to this circumstance—to the deficient tone of the extreme vessels, and to the imperfect resistance opposed by them to the increased action of the heart—is to be attributed, in part, the occurrence of hæmorrhage; or, in other words, vascular action overcomes the resistance opposed to it by the vital tone of the capillaries of the part in which hæmorrhage takes place. The frequent increase of action in this class of diseases induced Dr. CULLEN to arrange them amongst febrile complaints. But this increase is not general; and, even when it exists, it is often consecutive upon, or produced by, the sanguineous discharge.—When hæmorrhages are accompanied by excited action, the vascular excitement is frequently manifested chiefly in the parts affected, and in those adjoining them, in the form of active determination or congestion. Thus, in epistaxis, hæmoptysis, hæmatemesis, hæmorrhoids; &c.,

there is excited action in, or determination to, the organs or structures in the vicinity of the surface from which the blood is discharged, although the circulation in other parts of the frame may be natural, or even below the usual standard. This circumstance, in connection with the antecedent and concomitant phenomena of hæmorrhages, indicates an irregular distribution of vital action, generally attended by deficient organic nervous power or tone—an increase of vascular action in certain parts, and a diminution of it in others, rather than a state of general febrile commotion. In many instances, also, more especially in the symptomatic varieties, the extravasation is unaccompanied by increased action, and, as we shall see hereafter, is more frequently the result either of a morbid condition of the textures, or of the vessels themselves, or of impeded return of the blood, in connection frequently with plethora, local or general, and with other morbid states about to be noticed.

8. Whilst, however, we observe, thus frequently, an irregular distribution of vital action through the frame, the increased action, when increase exists, being in the seat and vicinity of hæmorrhage, it must be admitted that febrile commotion also sometimes exists and ushers in the sanguineous discharge. It would seem as if, in many of these cases, the febrile excitement accidentally produced, had given rise, owing to the increase of the *vis à tergo*, to the extravasation; the impaired tone of the extreme vessels being insufficient to antagonise the action of the heart.

9. In many cases, the hæmorrhage is altogether the result of irritation, particularly when applied to a mucous surface; but, in these, the sanguineous discharge is very slight, or is merely a part of the evacuation that takes place. Here the extreme vessels become enlarged or dilated, owing to that state of vital expansion which mucous and erectile tissues assume when subjected to irritants or stimuli. From the expansion thus induced, an increased momentum of blood in the enlarged capillaries, and the determination of the circulating fluid to this quarter, necessarily result. If we apply any irritating substance to a mucous surface, the nerves of the part are excited, their vital manifestations are at first augmented, and the capillaries are ultimately expanded or enlarged; the tissue assuming more or less of increased volume. This erectile state, which all vascular parts present in a greater or less degree, according to their vascularity, and the extent to which they are supplied with organic nerves, generally subsides when the irritation is withdrawn; but if it continues to act energetically, and especially if it affect the action of the heart, and thereby occasion general irritation or febrile commotion, the expansion of the extreme vessels may proceed so far as to solicit, upon hydraulic principles, so great a flux of blood through them as may overcome their power of vital resistance, or may occasion the exudation of this fluid through their pores, which, owing to their distension, acquire an increased diameter, and allow the red particles of the blood to exude. This result is still more likely to occur, when organic nervous power is deficient or depressed, as it frequently is in the constitutions and circumstances in which hæmorrhages occur.

10. The effect thus produced by material irri-

tants may take place from an excited state of the organic nerves supplying the tissue — the primary affection being in these nerves, and occasioning the vital expansion of the capillaries, the increased afflux of blood to these vessels, and all the contingent phenomena. Such appears to be the procession of morbid changes in many cases of active hæmorrhage of an idiopathic or primary kind. The first change takes place in the organic nerves of the affected part, and occasions the vital expansion of the capillaries, and thereby an increased flux of blood through these vessels, and the larger trunks supplying them; the excited state of the nerves, and the increased action of the vessels, being propagated to the heart through the medium of the organic nervous, and vascular systems. Thus febrile commotion is induced in the more active forms of hæmorrhage. If we attend closely to the symptoms in such cases, we shall find a sense of titillation, and of increased heat, with throbbing of the vessels, &c., ushering in the discharge of blood. These symptoms clearly indicate the first change produced on the organic nerves, and its effects upon the circulation of the part. At last the blood pours forth, and shows that the tone or power of resistance in the extreme vessels has so far yielded to the increased momentum of blood, as to allow the escape of a portion of this fluid through the pores of these vessels, and of the tissues in which they ramify; the vital cohesion of the tissues either being originally weak, or having become weakened by pre-existent disease, as in the case of consecutive hæmoptysis, or of hæmorrhage occurring in the course of fevers.

11. From this it will be seen, that, in active hæmorrhage, more or less excited action exists in the seat of the discharge, and, when it commences in this seat, it is propagated to the heart in the manner above stated. The mere demand which is made upon the heart by the augmented afflux of blood solicited by the dilated and discharging capillaries, is insufficient to account for the characteristic phenomena of this form of disease, without calling into aid the organic nervous influence, and the reaction consequent upon the sudden depletion of the vessels during a state of plethora. It will explain increased rapidity of the pulse, but little more. Whilst, however, I thus contend for the frequency of excited action in the seat of hæmorrhage, often confined chiefly to that situation or its vicinity, or extended more or less throughout the frame, and assuming various grades of activity, it must not be overlooked that this action is generally attended by impaired nervous power or tone, and weakened cohesion of the extreme vessels and tissues in which they ramify. In proportion to the feebleness of vascular action, and to the loss of vital tone and of cohesion of the capillaries and tissues, will the hæmorrhage present more of an asthenic or passive character. But there is no absolute or unvarying grade, to which the terms sthenic or active, and asthenic or passive, can be applied; but every degree of action, as well as of diminished tone, either above or below the healthy standard, will present itself in practice. This association of excited vascular action and capillary expansion, with weakened nervous tone and vital cohesion, argued far above, is fully evinced by the state of the pulse, which, in

most hæmorrhagic diseases, is broad, open, compressible, soft, and sharp; the parietes of the artery being felt as if yielding to the impulse of the heart, but quickly reacting upon the momentum with which the current of blood is propelled; thus imparting a sharp, or bounding, or jerking character to the pulsation.

12. It is not only an irregular distribution of organic nervous power, with vascular excitement and deficient tone, by which hæmorrhages are frequently characterised; but the diminished cohesion of the extreme vessels, and of the tissues in which they ramify, above alluded to, is often the prominent feature of the pathological conditions in which these diseases originate.—This diminution of vital cohesion in the part is generally associated with debility; and with weak, although frequent, or even excited, action of the heart; the phenomena varying with the state of action, or the degree of excitement, or, indeed, with the modified grades in which the different elements of this pathological state present themselves. In such cases, the dilated and congested capillaries, the deficient nervous power, and the generally weakened vital manifestations of the frame, require, in their different grades, the accurate recognition and attention of the practitioner. In many cases of truly *asthenic* hæmorrhage, the frequency of the pulse is mistaken for excitement. But, in these, the frequent contractions of the heart are the necessary consequence of the loss of blood, and of the imperfect tonic contraction of the series of circulating vessels upon their contents — are the result of the loss of tension in the vascular circle, and of the facility with which the current is propelled in a relaxed and yielding channel.

13. ii. *Changes in the Structures, the Seats of Hæmorrhage.*—The escape of red blood from the vessels generally takes place upon those surfaces most engaged in exhalation and secretion, and in those structures, which, owing to their natural laxity, furnish a slight support to the capillaries supplying them. Yet extravasation will not take place, as already remarked, during a healthy state of the part, or when its vital cohesion is undiminished. It generally supervenes in consequence of certain lesions of the action and organisation of the vascular and capillary systems, or of the tissues which they supply, or of both together. But it should not be overlooked, that a change in the state of the tissues will generally, sooner or later, affect the capillaries supplying them, whilst a lesion of the latter will also affect the state of the former. The question, therefore, chiefly regards the priority of affection, and the extent to which either becomes changed. But it should also be admitted, that the lesion may be coëtaneous and co-ordinate in both the capillaries, and in the tissues the seat of hæmorrhage.

14. Discharges of blood seldom take place to any amount, excepting in textures which furnish, from original conformation, or from diminution of vital cohesion, an insufficient support to the capillary vessels; and which imperfectly enable them to withstand the distending power to which they are subjected, by the occasional increase of the heart's action, and of the momentum of blood passing through them; or by an impeded return of blood through the veins; or by general or local plethora.—This important pathological fact is

demonstrated by the occurrence of hæmorrhages as a consequence of softening of the mucous surfaces, or of cellular and parenchymatous structures, or of serous membranes; particularly when their vital cohesion has been diminished by constitutional disease, and when the impulse or action of the heart and arteries has been increased by any external or internal cause. The sanguineous discharges occurring in dysentery, scurvy, purpura hæmorrhagica, fever, &c., are familiar instances of the influence of deficient cohesion of the tissues in the production of hæmorrhage; and epistaxis, hæmoptysis, hæmorrhoids, &c., illustrate a combination of this state with increased vascular action, in which both the heart and arteries participate.

15. iii. *Of Changes in the circulating Organs and Vessels in the Production of Hæmorrhage.* — As to the state of the capillaries in hæmorrhage, it is unnecessary to advance much beyond what I have already stated (§ 13.), because their conditions are very intimately associated with the states of nervous power and of vascular action characterising the attack. In all the more idiopathic hæmorrhages, the vessels cannot be said to undergo any rupture. Their minuter ramifications and extremities seem to be dilated, and their pores, whether lateral or terminal, so far enlarged by the deficient tone and cohesion of their parietes, and of the tissues in which they terminate, as to admit of the exudation of a large portion of the blood flowing through them. This state of the capillaries in the seat of hæmorrhage is, however, generally associated with other important changes in the circulation, and in the blood itself. The changes in the circulating organs vary in the different states of hæmorrhage. Those which precede and induce the discharge are generally different from those which accompany it, and ought to be carefully distinguished. They are principally the following: — 1st. Increased action of the heart, and general febrile commotion, as above explained — as in *active, sthenic, or febrile hæmorrhages*. — 2d. Determination of blood to the seat of hæmorrhage; or active congestion of its capillaries and larger vessels, with symptoms of excited action of the part and its vicinity chiefly — as in *sub-acute* cases. — 3d. Very frequent or very weakened action of the heart, with depressed nervous power, impaired tone of the circulation, and laxity of the soft solids — as in *asthenic, passive, or non-febrile hæmorrhages*. — 4th. Impeded circulation, and consequent congestion of the venous system, arising from disease of the heart. — 5th. Interrupted circulation through the liver, or impeded return of blood from any viscus or part — as in some *symptomatic hæmorrhages*.

16. The *first, second, and third* of these states have been sufficiently explained. — In the *first and second*, however, the dependence of the hæmorrhage upon inordinate action and hypertrophy of the heart should not be overlooked; effusion of blood within the cranium or into the lungs being occasionally caused by this organic lesion. — The *second* pathological state of the circulating system commonly precedes the discharge, or exists chiefly at its commencement — is frequently the immediate cause of the hæmorrhage and is generally removed by it, as in epistaxis, &c. — In the *fourth* of the above states, the hæ-

morrhage is entirely owing to the venous congestion or plethora induced by the cardiac disease. Extravasations of blood from this cause, generally assume states intermediate between active and passive. The obstruction to the circulation through some one of the cavities of the heart, extends its influence to the venous capillaries, and these also become congested. The action of the heart and arteries being unimpaired, or even increased, by the obstacle to the circulation through the veins, the congestion of the capillaries is thereby augmented, until, at last, their contents partially exude through their parietes or pores in the situations where they are of the greatest tenuity, or are weakest, or the least supported by the structures in which they are distributed. This form of hæmorrhage is analagous to the inflammatory action which occasionally takes place under similar circumstances; and differs from it chiefly in respect of the states of vital cohesion and tone in the vessels and tissues affected, and of the fluids discharged from the diseased parts. Where inflammatory action is the consecutive affection, the organic nervous power of the part, and the tone of the capillaries, have not been overpowered by the congestion or local plethora to which they had been subjected, but re-act upon the causes of distension. When, however, hæmorrhage is the result, we may infer, either that the tonic action of the capillaries has been overcome, and the blood has exuded through them, as just stated; or that the cohesion of the tissue has been so weakened as to deprive the capillaries of the necessary support, and thus to favour their dilatation and the consequent effusion; but it is very probable that this result more frequently arises from the co-existence of both these changes, than from either of them singly. This reasoning equally applies to the hæmorrhages consequent upon obstructed circulation through the liver, or interrupted return of blood through any part of the venous system. A large proportion of cases of hæmatemesis, of intestinal hæmorrhages, of hæmorrhoids, of hæmoptysis, and of extravasations into parenchymatous organs, are caused in part, if not altogether, by this state of the circulation; although debility, vascular plethora, &c. are also often concerned more or less in their production.

17. iv. *Of the States of the Blood in Hæmorrhages.* — Changes in the circulating fluid, as to quantity and crasis, are more concerned in the production of hæmorrhage, than modern writers have admitted. — In the *first* of the pathological states of the circulating system (§ 15. 16.), the blood possesses nearly its natural crasis; and, when vascular excitement is considerable, it often presents similar appearances to those in inflammation, and is not remarkably deficient in fibrine. In this state of the disease, especially, marked evidence of vascular plethora has preceded and ushered in the attack. — In the *second state* of the circulation (§ 15.), the blood may be of natural appearance, or it may participate slightly in the inflammatory or sthenic characters; or its crassamentum may be loose, and either large or small, for the quantity of serum. Its fibrine may be also more or less deficient. In this state, general as well as local plethora usually exists at the commencement of the seizure.

18. In the *third*, or decidedly *asthenic*, pathological condition (§ 15.), the blood is more manifestly altered than in either of the above. It usually does not separate into a firm coagulum. Sometimes no separation into crassamentum and serum takes place; and, if it does so separate, the former is loose, dark, or even black, particularly in its lower part, and readily mixes with the serum, in which it is occasionally sunk, appearing like a black deposit at the bottom of the vessel. In some cases, the blood flows from the part like a dark cruor or sanies, without coagulating, or contributing thereby to the arrest of the discharge: in other instances, it is pale, thin, and watery. The deficiency of fibrine in all these circumstances is very remarkable. In several, the serum is unusually albuminous. In this form, there may be general or partial vascular plethora at the commencement of the attack; but I believe that a state of anæmia is sometimes present, particularly when the blood is pale, thin, and watery; at least, there is an obvious deficiency of fibrine and of red particles. This state of the circulating fluid is sometimes primary; is not infrequently associated with a lax or delicate organisation of the extreme vessels; and evidently contributes to the production of the hæmorrhage: the weak or lax capillaries giving a ready issue to the thin fluid, especially in its state of deficient crasis.

19. Whilst the *first*, *second*, and *third* pathological conditions of the vessels above noticed, — which may be considered as constituting the more idiopathic forms of hæmorrhage — are thus attended with various morbid states of the circulating fluid; some of these states, however, being proper to, or the usual concomitants of, these conditions of the vessels; it should be recollected that each of these conditions insensibly passes into one another, and that each of those morbid appearances of the blood is variously modified and combined; so that hæmorrhagic diseases, in the different forms, states, and complications in which they present themselves to our notice, are occasionally accompanied with every morbid change comprised in the article on the *Pathology of the Blood*. Moreover, the appearance of this fluid varies, at different stages of the same seizure, with the quantity lost, and with the depression of vital power thereby produced; so that when the hæmorrhage has been to a very considerable amount, the proportion of serum becomes relatively much increased, owing to the rapid absorption of fluids into the circulation from the *prima via*, and different tissues and organs; the density of the coagulum being, at the same time, more or less diminished, and the quantity of fibrine remarkably lessened, as the *sthenic* passes into *asthenic* action, until, at last, fibrine can scarcely be detected in the more *asthenic* or passive forms of the disease.

20. Of the frequency of *plethora*, general or local, as an element of the pathological condition ushering in hæmorrhage, the practitioner should be fully aware; as the removal of this state is intimately connected with the prevention and judicious treatment of the disease. The quantity, as well as distribution, of the blood in the system, the state of organic nervous power, by which local determinations of blood are chiefly produced, the degree of vascular action, and the turgidity of the part affected, vary with the *age* of the

patient, with his constitution and temperament, and with the nature of antecedent or associated disorder. It may be stated as a general inference, that hæmorrhages are more referrible to excited action of the heart, to irritation in the seat of discharge, and to a dilated or morbidly erectile state of the capillaries, conjoined with increased action of arterial vessels, and, consequently, that they partake more of an acute, active, or *sthenic* character, the earlier the age of the patient. On the other hand, they more evidently depend upon obstruction to the venous and capillary circulation; on a softened, relaxed, or diseased state of the structure, in which they occur; and on lesions of the vessels themselves; and, therefore, are more commonly of a passive or *asthenic* kind, or, at least, present the lower grades of activity, the more advanced the periods of life at which they take place. As to the influence of *age* on the forms of hæmorrhage, my opinions are not very different from those of STAHL, in whose writings may be found much of what has more recently been advanced on the pathology of this class of diseases.

21. v. REMOTE CAUSES OF HÆMORRHAGE. — *a.* *Predisposing causes.* — The frequency of hæmorrhages, especially their more active states, is greater in the sanguineous, the irritable, or the sanguineo-bilious *temperaments*, in plethoric constitutions, and in the scrofulous *diathesis*, than in the nervous, lymphatic, and melancholic temperaments, and in spare habits of body. — They are more common and abundant towards the completion of youth, than at any other period; and they are comparatively rare in infancy and in old age. Females are more subject to them than males. They occur sporadically, and are more frequent in spring than at any other season; but are scarcely ever epidemic; although at Breslaw they prevailed at one time to a remarkable extent, — children having epistaxis, adults hæmoptysis, and the aged hæmorrhoids. There may be said to be a hæmorrhagic *diathesis*; inasmuch as hæmorrhages are more common in the offspring of parents who have experienced attacks, than in others; and as they are often observed in several children or members of the same family. M. CHOMEL remarks that hæmorrhages from the rectum, urinary organs, and uterus, occur oftener in cold than in warm seasons; and that epistaxis and hæmoptysis takes place more frequently in summer than in winter. I believe that this is the case, especially during dry states of the air. In childhood, hæmorrhage takes place chiefly from the pituitary membrane; in adolescence, from the bronchial surface; and in mature age, from the rectum, the urinary and uterine organs. — Whatever tends to increase the quantity of the circulating fluid, is, so far as it has this effect, a predisposing cause of hæmorrhage; as too much or too little nourishing food, indolence, the suppression or retention of accustomed discharges, the neglect of requisite evacuations, and the loss of a limb.

22. *b.* The *exciting causes* are — sudden increase of temperature; great dryness, and the rapid diminution of the weight, of the atmosphere; the use of alcoholic liquors or of other stimulants; violent mental emotions, especially anger, joy, &c.; too warm clothing, or too warm apartments; muscular exertions, quick walking or running; ascend-

ing heights; and various chemical and mechanical irritants. These causes generally give rise to the more active or *sthenic states* of the disease. Dr. PARR very justly disputes the rarefying influence of heat on the blood in the production of hæmorrhage, and refers the operation of this agent chiefly to the living solids. There can be no doubt of heat not only exciting the nerves, but also causing an expansion of the extreme capillaries and increased fluxion to the parts affected by it.—The usual causes of debility—as insufficient and unwholesome nourishment, the depressing passions, fatigue, contamination of the circulating fluids by impure or close air, poisonous injesta, exhausting secretions, masturbation, &c.—principally occasion *asthenic* hæmorrhages.

23. vi. The SYMPTOMS differ very remarkably according to the situation and circumstances in which hæmorrhage takes place. They vary also with its extent and rapidity—according as it constitutes the principal lesion, or is a contingent and comparatively unimportant phenomenon. When extravasation takes place in the substance of an organ, the functions performed by such organ will be interrupted co-ordinately with its amount and rapidity; but when it occurs into one of the large serous cavities, little interruption of function is observed, until the effusion is so great as either to produce syncope or to embarrass the adjoining organs by pressure. Hæmorrhage from mucous surfaces is generally made manifest by its discharge through the outlets of the canals in which it takes place. Yet, even in these cases, the extravasated blood may be retained, although its quantity is so great as to give rise to the most serious results. The blood itself presents all the appearances already described (§ 17. 18.), according to the state of vital power and of vascular action, and the quantity and quality of this fluid. If it be contained long in any cavity or part, it will be coagulated, or grumous, or thick, dark, greenish, brown, or sanious, or otherwise altered, according to the situation, the period of retention, and the state of the patient. When extravasated blood passes through a large portion of the digestive canal, it is still more remarkably changed by admixture with the secretions, gases, and other matters in this situation. Hæmorrhage, as to quantity, varies from a few drops to several pounds.

24. A. The symptoms preceding and attending hæmorrhage differ so as almost to defy description.—The more active and *sthenic* forms are preceded by signs of general plethora and of increased action; slight horripilations, and a frequent, full, open, and jerking, or bounding pulse, often ushering in the attack. The more *asthenic* states frequently are unpreceded by any distinct premonition, and are unattended by vascular reaction; flaccidity of the soft solids, with a weak, soft, rapid, or expanded pulse generally accompanying the discharge. In the *former*, there is a sense of heat, tension, fulness, and throbbing, with slight or shifting pain, at the commencement, and often actual increase of temperature in and near to the seat of hæmorrhage. In the *latter*, these sensations are rarely felt, and increased temperature is not observed; general uneasiness, with pallor, shrinking, and coldness of the extremities, in various degrees, being common to both.—In the *active* states, the blood is florid, coagulates readily and firmly, and frequently ceases to be discharged

as soon as the evacuation has proceeded so far as to remove the plethora, and increased action occasioning it; the patient often feeling lighter and better from the attack. But this is by no means uniformly the case; as the hæmorrhage sometimes proceeds to a dangerous extent, not merely as respects the organ affected, but as regards the quantity of blood lost to the œconomy. This arises from the nature of the local lesion associating itself with the hæmorrhage, or from the vital depression caused by the discharge, or from the lost power of the capillaries, or from the difficulty with which local fluxion or determination of blood is arrested, when once established and an outlet given to it, particularly when the coagulating property of the blood is impaired owing to deficiency of fibrine, or from two or more of these causes conjoined.—In the *passive* states, on the contrary, the blood is dark, fluid, thin, or even pale, and incapable of coagulating firmly, or even at all. The powers of life sink still lower as the hæmorrhage proceeds, and become less capable of arresting it, until the relation subsisting between the action of the heart, the tonic contraction of the arteries upon their contents, and the quantity of the contents in respect to the power of vital reaction possessed by these vessels, is subverted; and the patient, in consequence of the subversion, experiences successive attacks of syncope, or suddenly expires.

25. In all cases where hæmorrhage proceeds so far as to depress the pulse, or does not stop after the plethora and increased action have been removed by it, and still more remarkably in the *asthenic* forms, pallor of the countenance and general surface, coldness of the extremities, a shrunk or empty state of the cutaneous veins, faintness or full syncope on assuming the sitting posture, are present, in a degree usually coordinate with the extent to which the discharge has proceeded.

26. B. The Duration of hæmorrhage is extremely various. It may only continue a few seconds, or many hours, or even days. It may persist with slight intermissions for months or even years. It may be continued, or remittent, or intermittent. When this last, it may be either irregular or periodic.

27. vii. The DIAGNOSIS of hæmorrhage requires but little remark, as the subject is more fully noticed hereafter. In cases of very sudden and copious internal hæmorrhage, causing syncope or sudden death, these results may be mistaken for the more common forms of syncope, or for death from apoplexy or from disease of the heart. But the remarkable pallor of the lips, tongue, gums, and general surface; the smallness and emptiness of the jugular and superficial veins; the circumstance of the veins not filling beyond where pressure is made; and the history of the case previously to, and at the time of, either of these occurrences taking place, will point out the nature of the disease, even although no external discharge of blood be observed.

28. viii. The PROGNOSIS entirely depends upon the situation and form of the hæmorrhage.—It is extremely unfavourable when it takes place into the structure of an organ. It is equally so, when it occurs into serous cavities. When it proceeds from mucous surfaces, the danger is generally very much less: it is, however, great, when it is symptomatic of structural disease of the vessels, or of any part of the circulating system, or

of tubercular formations, and when it unequivocally presents asthenic characters. The prognosis is the most favourable, when the hæmorrhage is primary or idiopathic; when it arises chiefly from plethora and excited vascular action; and when it is seated in mucous canals. The nearer to the outlets of these canals it takes place, the less is the risk from it.—Epistaxis and hæmorrhoids are unattended by any danger, unless in cachectic habits, or when there is serious associated disease of related parts; or when protracted, asthenic, or uncontrolled by treatment. But the prognosis must be formed from the states in which individual forms of hæmorrhage present themselves in practice.

29. ix. DIVISION OF HÆMORRHAGES.—Discharges of blood have been divided, in modern times, into certain forms or states indicative of the circumstances in which they take place. Their separation into *active* and *passive* has been very generally adopted since the days of STAHL, who first employed this division; and these terms, or their correlatives, *Sthenic* and *Asthenic*, have been retained for the purpose of expressing the states of vital power and of vascular action upon which hæmorrhages principally depend, in their more idiopathic states. They have likewise been very generally divided into *Idiopathic*, *Traumatic*, and *Symptomatic*,—an arrangement to which, as well as to the former, attention should be paid both in pathology and in practice; and which has been very generally followed, even when the terms *primary*, *essential*, and *spontaneous* have been adopted with reference to the first of these; and *secondary*, *consecutive*, or *sympathetic*, to the third.—Hæmorrhages have also been classed into *Constitutional*, *Accidental*, and *Critical*. WILLIS arranged them into *critical*, and *morbid* or *non-critical*; DARWIN, into *arterial* and *venous*; and BICHAT, into those proceeding from *rupture*, and those from *exhalation*. A much more elaborate arrangement has been proposed by LORDAT. He divides hæmorrhages into—1st, Those proceeding from a *general fluxion*;—2d, from *expansion*;—3d, from *local fluxion*;—4th, from *adynamia*;—5th, from *loss of resistance* in the part;—6th, from *expression*;—7th, from *wounds*;—8th, from *sympathy*. MM. PINEL and BRICHTEAU have proposed a division of this class of diseases into—1st, *Constitutional*;—2d, *Accidental*;—3d, *Vicarious*;—4th, *Critical*;—and, 5th, *Symptomatic*. M. CHOMEL has arranged them into—*a*, *active*,—*β*, *passive*,—*γ*, *constitutional*, and—*δ*, *accidental*. DR. CARSWELL has classed them as follows:—i. *Hæmorrhage from Physical Lesions*.—A. From solutions of continuity—*a*. Incised wounds;—*b*. Puncture;—*c*. Laceration;—*d*. Ulceration;—*e*. Mortification:—B. From mechanical obstacles to the circulation—*a*. Situated in the heart;—*b*. In the blood-vessels.—ii. *Hæmorrhage from Vital Lesions*.—A. From a modification of the functions of the capillaries—*a*. In vicarious hæmorrhage;—*b*. In hæmorrhage from erectile tissue:—B. From a diseased state of the blood—*a*. In scorbutus;—*b*. In some forms of purpura;—*c*. In some forms of typhoid fever:—C. From debility—in depending parts of the body.—The chief objection to this ingenious arrangement is the neglect of the states of vital power and of vascular action more or less characteristic of the primary forms of hæmorrhage.

30. The following classification will be found to comprise all those states of hæmorrhage which fall within the province of the physician, and respecting which a full inquiry has been instituted above.

i. HÆMORRHAGE FROM PHYSICAL CAUSES:—A. From sudden diminution of the weight of the atmosphere; support being thus removed from extreme vessels and from yielding tissues, &c., whilst the impulse, or *vis a tergo*, is undiminished:—B. From incision, puncture, or laceration of a vessel or vessels.

ii. HÆMORRHAGE FROM LESIONS OF VITAL POWER AND ACTION:—A. From excited action chiefly—*a*. Of the vascular system generally;—*b*. Of the vessels in the seat of hæmorrhage principally, or from local determination: B. From plethora—*a*. Associated with general excited action;—*b*. With local action or determination;—These constitute *active* or *sthenic* hæmorrhage:—C. From debility chiefly—hæmorrhage taking place in depending or relaxed parts:—D. From deterioration of the blood—*a*. Conjoined with debility and impaired action;—*b*. With excited action and exhausted vital power—as in certain states of fever, &c.—These constitute *passive* or *asthenic* hæmorrhage.

iii. HÆMORRHAGE FROM INTERRUPTED CIRCULATION:—A. Through the heart;—B. Through the portal vessels.—C. Through other venous trunks.—In all these venous and capillary congestion precedes, and chiefly causes, the discharge.

iv. HÆMORRHAGE FROM ORGANIC LESIONS:—A. From alterations of the vessels themselves.—*a*. From inflammation, softening, rupture, &c. of their coats;—*b*. From ossific, or other morbid formations in their tunics:—B. From lesions of the tissues the seats of hæmorrhage—*a*. From softening of the tissue;—*b*. From ulceration;—*c*. From tubercular formations, &c.;—*d*. From mortification.—The first and second of these orders comprise these forms of hæmorrhage which are usually denominated *primary*, *idiopathic*, or *essential*; the third and fourth, those which are commonly called, *secondary*, *consecutive*, or *sympathetic*.

31. x. TREATMENT.—The treatment must have strict reference to the morbid conditions on which hæmorrhage depends, and according to which I have attempted to arrange the forms and states of the disease. In the observations, however, about to be offered, I shall allude merely to those varieties which chiefly require medicinal aid, and pass over those demanding the active interference of the surgeon.

32. A. *Hæmorrhage from physical causes*, particularly from puncture, incision, and laceration, seldom falls within the province of the physician; but when it does, as when occurring in any of the internal viscera, the principles which should guide him in other cases ought to direct him in this: inordinate action should be restrained, in order to diminish the effusion and to prevent its recurrence; and extremely depressed power cautiously restored, especially when life is thereby threatened, or when the system is incapable of producing coagulable lymph, by means of which a firm coagulum may be formed, and further hæmorrhage be thus prevented.

33. When the hæmorrhage is caused by the sudden diminution of atmospheric pressure, the propriety of having recourse to bloodletting, unless vascular action be manifestly increased, is

questionable. The removal of the cause, when the hæmorrhage is urgent, should alone be confided in. In slighter cases, the sanguineous discharge generally disappears soon after the vascular system has accommodated itself to the novel circumstances in which it is placed.

34. *B. Hæmorrhages from changes in vital power and vascular action* interest chiefly the physician, and require the utmost pathological discrimination and practical decision. Upon the opinion that will be formed as to the degrees of augmented action, or of diminished power, or of vascular repletion, or of asthenia, not only will the success of the treatment, but also the life of the patient, depend. And amongst the most difficult of the many difficult topics with which the practical physician will have to concern himself, none is more difficult or more important than to discriminate the pathological conditions just mentioned.

35. *a. Hæmorrhage depending upon, or connected with, excited vascular action*, generally requires an antiphlogistic treatment; but with strict reference to the degree of action and of organic nervous power, and to the quantity of blood which has been lost. Of these states the practitioner should be capable of forming a correct estimate, and of directing remedies appropriate to them with a decision commensurate with the urgency of the case.—When the discharge takes place from vital organs, he ought not to confide in a single remedy only, however energetic or appropriate; nor even in a succession of remedies; but should so combine his means as that the one may promote the operation of the others.—*a*, When the action of the heart and vascular system is increased, especially if the patient be young, plethoric, or robust, *bloodletting*, general, local, or both; and internal and external *refrigerants*, conjoined with *sedatives* and *astringents*, are indispensable. But the practitioner should be careful in discriminating between the broad, open, quick, and irritable pulse frequently attendant upon hæmorrhage with deficient vital power, or upon the reaction following large losses of blood; and the full, hard, and jerking pulse more commonly observed at the commencement of sthenic hæmorrhage. I have already shown, in the article BLOOD (§ 58.), that copious losses of this fluid, especially when productive of vital depression or syncope, are generally followed by more or less of reaction. This reaction should be prevented from wholly supervening, or from reaching an inordinate pitch, lest it reproduce the hæmorrhage, and thereby endanger the life of the patient. When it occurs after large hæmorrhages, we should carefully determine, from the tone and character of the pulse, from its softness or compressibility, or action under the pressure of the finger, the degree of tone or vital power attending it. By thus endeavouring to estimate the exact state of the vascular action, attendant, as well as consequent, upon hæmorrhage, the conclusions, which will be arrived at, will suggest the most efficient means of cure.—In cases where the excited action has been preceded by a large loss of blood, we shall in vain attempt to restrain it by further depletion; for it will be generally found that, however excited the action, or frequent the pulsation, vital power is extremely depressed; and that a further depletion will only render the heart's action

more frequent, and the pulse more irritable. It is in such circumstances, especially, that a decided but judicious use of sedatives, refrigerants, and astringents, such as will be hereafter noticed, should be resorted to.

36. In cases unattended by general vascular excitement, or in those characterised chiefly by local determination, vascular action being manifestly concentrated, more or less, towards the seat of hæmorrhage, and proportionately diminished in other places, a principal part of the treatment should be calculated to derive the blood from the organ affected, and to equalise the circulation. In such cases, *cupping*, warm *pediluvia*, and, when vital power is much depressed, and the further loss of blood cannot be afforded, *dry cupping*, should not be neglected. This last means I have found of great benefit when extensively or repeatedly resorted to.

37. In general, leeches are not appropriate means of depletion in hæmorrhages, although they may be of service in removing the local congestions or inflammatory irritation sometimes consequent upon them. Cupping should be preferred when local depletion is required; and in most instances in which bloodletting is indicated, even in a small quantity, venæsection will be the preferable mode of performing it. Most of the older writers advised, for the removal of hæmorrhage, venæsection in the standing or sitting posture, and with a large orifice, with the intention of speedily producing syncope; believing that a coagulum would be more likely to form at the orifices of the bleeding vessels during this state. If the hæmorrhage proceeded from one or more large vessels, as in wounds and injuries, the propriety of this practice need not be disputed. But when the blood is merely exuded from the mucous surface, as in most cases of internal hæmorrhage, this practice is of more doubtful efficacy; and, if it were generally adopted, even in young and robust persons, might be injurious, especially if the discharge had been already copious. Besides, the reaction consequent upon full syncope may cause a return of the effusion. It will, therefore, be preferable, in the majority of instances, to carry the depletion no further than to produce slight faintness, avoiding the supervention of full syncope; and to give refrigerants or astringents and anodynes so as to prevent subsequent reaction.

38. *β. Evacuations by emetics and purgatives* may be either beneficial or prejudicial, according to the peculiarities of the case. But the circumstances indicating or contra-indicating their use, will be made manifest, when I come to consider hæmorrhage with reference to its seats.

39. *γ. Refrigerants* are important agents in the controul of sthenic hæmorrhage, and much discrimination may be shown in the selection of them for particular cases. In general, those which are astringent, and increase the crasis of the blood, should be preferred.—The *mineral acids*, especially the sulphuric, the sulphates, the nitrates, the vegetable acids, particularly the acetic, and the internal and external application of cold, are severally useful in various circumstances.—The most energetic, however, of these, are the *sulphate of alumina* or the *super-sulphate of potash*, given in the compound infusion of roses, and the *super-acetate of lead* with acetic acid; but, in these, the

astringent is equally powerful with the refrigerant action. The *nitrate of potash* and the *muriate of ammonia* are useful refrigerants, but are most beneficial in the circumstances about to be noticed. Cold, internally, as iced water or iced lemonade, &c., or externally, in any of the various forms of applying it, is an useful adjuvant of other means; but it should not be employed so as to give rise to reaction, or to favour congestion in the seat of the disease, — consequences which may follow its injudicious use, internally as well as externally.

40. *δ. Astringents*, in active hæmorrhage, are most serviceable, after evacuations have been carried as far as circumstances permit. They should be either conjoined, or alternated, with refrigerants; and occasionally, also, with demulcents and sedatives or anodynes. Any of the individual substances belonging to this class of medicines may be employed according to the urgency of the case; but, with the exception of the spirits of turpentine, the mineral are more energetic than the vegetable astringents. Of the former of these, the *sulphates of alumina*, of zinc, of copper, and of iron, are most frequently employed, either alone, or in vehicles containing diluted sulphuric acid. The tincture of the *muriate of iron* and the *nitrate of silver* are also often used, both externally and internally; but these, and all the vegetable astringents, with the exception just made, are also tonic, and are less serviceable in active than in passive hæmorrhages. In the former, however, they are often useful; and, when given in doses so large as to occasion nausea, they have also a sedative action. The *acetates of lead*, with acetic acid, and the *acetate of zinc*, are, on account of their sedative action, amongst the most appropriate mineral astringents in active hæmorrhage.

41. The spirit of *turpentine* appears to have been employed by the ancients in the treatment of hæmorrhages. It was much used, both internally and externally, during the sixteenth century, but had afterwards fallen into disuse. In the year 1817, I employed it internally in these diseases, and have since continued to prescribe it. (See my *Memoir on the Use of Terebinthinate Remedies in Disease*, Lond. Med. and Phys. Journ. for July and August 1821.) It constricts the capillaries of the part to which it is applied; but, owing to its stimulating action on the nerves, sthenic vascular reaction frequently follows; which, however, soon subsides. When used in large quantity, these effects are proportionately great; and it thereby exerts a powerful derivative influence. When absorbed into the circulation, its astringent effects on the capillaries are also remarkable. Its action varies much with the dose, relatively to the vital energy of the patient. When the dose is large, it reduces the frequency and strength of the heart's action, especially when they are much increased; and hence it is an appropriate remedy in the more active forms of hæmorrhage, inasmuch as, with its constricting action on the capillaries, it weakens the *vis a tergo*. When given in smaller doses, and carried into the blood, it increases the tone, and changes or modifies the action of the extreme vessels. From a very extensive experience of this medicine in hæmorrhagic and other diseases, I may add, that large doses of it should be prescribed with caution, when the powers of life are very much depressed; and that, when a considerable dose of it has been

given in such cases, it ought to be carried off by stool. The existence of inflammatory action does not contra-indicate its use, as many have supposed from a misconception of its operation; for it lowers vascular excitement, and prevents effusion and the formation of coagulable lymph, especially when taken in sufficiently large or repeated doses. When the powers of life are much impaired, and after copious evacuations of blood, small and frequent doses of it only ought to be given, conjoined with tonics, aromatics, restoratives, &c.

42. *ε. Sedatives and Narcotics* are severally beneficial in active hæmorrhages, but chiefly as adjuvants of more energetic means. The most useful sedatives, in this form of the disease, have already been noticed. — *Hydrocyanic acid* and its preparations are sometimes of service, when much irritability, spasm, or restlessness, attend or follow the hæmorrhagic attack. *Digitalis* is, however, more generally appropriate, inasmuch as it lowers the action of the heart, and increases the tone of the extreme vessels. — *Narcotics*, especially opiates, are frequently serviceable in similar circumstances, but chiefly in combination with astringents and refrigerants. *Opium* may be conjoined with any of the substances comprised in these classes of medicines; or the acetate of morphia may be given with the acetate of lead, or the muriate of morphia with the muriated tincture of iron. *Hyoscyamus*, *conium*, the *humulus lupulus*, *colchicum*, and other narcotics, have been severally recommended to palliate some of the contingent phenomena of the disease; but they require no further remark.

43. *ζ. Diaphoretics* have been employed with the view of equalising the circulation, or determining it to the surface of the body, especially when coldness of the extremities and skin accompanies the discharge. But the cooling diaphoretics should only be prescribed — as the nitrate of potash with the sweet spirit of nitre, and the solution of the acetate of ammonia with an excess of acetic acid. In order to derive to the surface, and to equalise the circulation, external derivatives, rather than stimulating diaphoretics, ought to be employed. — The derivatives most to be confided in, in these cases, especially when the hæmorrhage is copious, are the hot turpentine epithem or embrocation, or sinapisms; but the former is much more quick and efficient in its operation, than the latter.

44. *η. Demulcents*, especially the gums, were formerly much employed in hæmorrhage; but are now seldom used, unless as vehicles or adjuncts of more active substances. They are, however, of service in several forms of hæmorrhage, especially where it is desirable to diminish irritation in mucous passages or canals. Powdered gum, when applied to a bleeding vessel or surface, will sometimes arrest the discharge by promoting the coagulation of the blood.

45. *b. Hæmorrhages depending upon asthenia, or the more passive states of hæmorrhage noticed above*, should be attacked directly by means of astringents and derivatives. — *a. Bloodletting* is generally inadmissible; and *refrigerants* must be employed with caution, unless their astringent action be very considerable. Even cold should be cautiously prescribed. In some cases, the momentary impression of cold, as of iced water sprinkled on the back or on the genitals, is of service; but a prolonged application of it may be

injurious, or even dangerous. The *vegetable astringents*, as possessing more or less of a tonic property, are especially indicated in the asthenic forms of hæmorrhage; and, of these, the *extract of catechu*, *kino*, the preparations of *krameria*; *tannin* and *powdered galls*; the bark of the root or fruit of the *pomegranate*; the *simarouba* and *cinchona* barks; infusions of *oak bark*, or of the *uva ursi*, or of *roses*, or of the root of *tormentilla*, or *bistorta*; the *vegetable acids*, also, especially the gallic and acetic; *kréosote* conjoined with the latter of these, or with some other vegetable astringent; the *ergot of rye*; the *terebinthinates*; the *balsams*, and *camphor*, are severally appropriate; and either of them may be prescribed with other means, according to the circumstances of the case. Of these, the spirit of turpentine, in small and frequent doses, with tonics, restoratives, and aromatics, is most deserving of confidence. The *mineral astringents*, especially those already noticed (§ 40.), and the *tonic mineral salts*, may also be employed.

46. *β*. When hæmorrhage proceeds chiefly from, or is connected with, a *deteriorated state of the circulating fluids*, the *chlorate of potash*, or the *chlorate of lime*, may be prescribed with tonic or astringent infusions; and the nitrate of potash may be added, or taken alone in similar vehicles. The spirit of turpentine may also be given in small and repeated doses, with camphor and aromatics.

47. *γ*. In all the forms of asthenic hæmorrhage, *derivatives*, especially the hot turpentine epithem and sinapisms, are of great benefit.—*Emetics* and *cathartics* are rarely indicated; although morbid secretions and fæcal accumulations ought to be evacuated.—*Diuretics* are of service chiefly as adjuncts of more energetic means.—*Anodynes* are rarely necessary; but digitalis is sometimes useful, conjoined with tonic astringents.—*Opiates* are also occasionally serviceable, in similar combinations.

48. *δ*. In those *intermediate states of hæmorrhage*, in which it is difficult to determine whether the active or the passive conditions predominate, and where there appears to be an irregular distribution of action and vital power, rather than general excitement or depression of either, *derivation* by *dry cupping*, by the warm *turpentine embrocation*, or by *sinapisms*, and the internal use of appropriate *astringents*, are chiefly to be relied on.

49. *c*. Those forms of hæmorrhage which may be denominated *constitutional*, and which partake more of the active than of the passive character, require much discrimination. They are generally dependent chiefly upon absolute or relative plethora; and ought not, therefore, as in many other cases of active plethora, especially when thus associated, to be early or officiously interfered with. This form should, therefore, be promoted when incomplete, or treated by depletions, and moderated or arrested when it becomes very considerable or excessive.—When a constitutional hæmorrhage is abortive or prematurely arrested, sanguineous effusion may take place in the parenchyma of an organ, or in some dangerous situation. In this case, the morbid deviation should be combated by means calculated to restore the hæmorrhage to its former seat, to arrest it in the part consecutively affected, and to prevent the bad consequences likely to ensue in the latter situation.—If the hæmorrhagic deviation—

the change in the seat of constitutional hæmorrhage—is favourable, as when epistaxis or hæmorrhoids occur, instead of hæmoptysis or hæmatemesis, the interference of art ought not to be interposed, unless the loss of blood is very considerable or alarming.

50. *d*. When hæmorrhage depends upon *obstructed circulation in the heart, liver, or lungs*, and, consequently, upon venous plethora, the *indications* are—to remove this obstruction as much as possible; to diminish the fulness of the veins; to determine predominant action to external parts; and to impart tone to the surface and capillaries affected. The means by which the *first* of these ends is to be accomplished, are pointed out in the articles on the diseases of the organs just mentioned; and those which will accomplish the other intentions have been already noticed.

51. *e*. In all forms of hæmorrhage, the indications of cure, as well as the individual means, should more or less depend upon the causes, upon the seat, and upon the quantity, of the effusion; and should, moreover, be modified by the symptoms, by the age, and the previous state and habits of the patient. For the hæmorrhages which mainly depend upon organic lesions, the treatment should be directed to the removal of these lesions; but, when the effusion is considerable, or takes place into the substance of an organ, immediate means ought first to be used to arrest it; and these means should be strictly appropriate to the states of vascular action and of vital power, conformably with the principles already developed. It is indispensable to the judicious treatment of hæmorrhage, to ascertain and to remove the remote and immediate causes; and to place the patient in a situation and circumstances favourable to the removal of the attack, as well as to the prevention of its recurrence. Hæmorrhage from the lungs, the stomach, intestines, and urinary organs, as well as into the parenchyma of internal viscera, and into shut cavities, are serious occurrences, and should be immediately arrested. When it proceeds from the nose or anus, it is seldom dangerous, and may be left to itself, unless it become excessive. Whenever the loss of blood, in whatever situation it occurs, is so great as to produce much debility, prompt measures should be employed to arrest it. If syncope takes place in such circumstances, the recumbent posture; the aspersion of cold water, or of a small quantity of eau de Cologne or lavender water, on the face; or aromatic vinegar held at a little distance from the nostrils; will restore the patient. But if the hæmorrhage has been so great as to render these means insufficient, an immediate recourse may be had to the transfusion of blood from a healthy person. When convulsions supervene upon large losses of blood, opium, with camphor or other restoratives, should be prescribed.

52. *ii. Of Regimen and Prophylaxis.*—*a*. In *active hæmorrhage*, the patient should be removed to a cool apartment, and repose of body and mind enjoined. He ought to be so placed as that the seat of effusion is most elevated. The clothes should be taken off or loosened; and every obstacle in the way of external applications removed.—When the hæmorrhage has ceased, the same antiphlogistic regimen as was pursued during its

continuance, should be persisted in for some time ; and gradually changed. If the effusion have been slight, and particularly if the pulse continue full or strong, venæsection or cupping should be practised, or even afterwards repeated, in order to prevent a recurrence of the hæmorrhage, or the supervention of congestion or inflammatory action in the part. When the discharge and the treatment have removed both the attack, and the attendant general and local plethora, the practitioner should endeavour to ascertain still further the pathological conditions from which the hæmorrhage proceeded, as well as those which remain after it, and to remove them. He ought also to enjoin the avoidance of whatever may cause plethora, or may determine the circulation to the seat of hæmorrhage, or weaken organic nervous power. If the symptoms indicating the recurrence of hæmorrhage appear, a full venæsection should be practised.

53. The *Diet* ought to be chiefly farinaceous ; and ripe acidulous or mucilaginous fruits should be liberally allowed. The drink should be made slightly acid, by vinegar, or any of the mineral or vegetable acids. This diet ought to be continued long after the attack. The strong or rich wines, all malt liquors, and spirits, should be uniformly shunned.

54. *b.* After *passive hæmorrhage*, the system should be strengthened, by means the least likely to cause plethora ; by regular and moderate exercise in the open air, near the sea ; by sea voyaging or short excursions ; and by avoiding whatever is likely to favour congestion of the seat of the former effusion, and to depress the mind.

55. *c.* The *repetition* of hæmorrhage, whether of an active, passive, or intermediate character, ought to be carefully prevented ; as two evils result from this circumstance, independently of the danger directly connected with it : if the attacks are slight, they are apt to become habitual or constitutional ; and, whether slight or severe, they cause disorganisation of the part affected. When hæmorrhage has become habitual, it should not be prematurely suppressed, without having recourse to vascular depletions in its stead, or instituting some external discharge ; and even this latter may not be sufficient.

56. *d.* *Constitutional hæmorrhage*, when it is abundant and debilitating, should be treated, in the intervals, by a spare and cooling diet and regimen. Positions which will favour the flux of blood to the organ affected, or impede the return of it, should be avoided ; and direct or indirect excitement or irritation of the part, ought to be removed. Whatever tends to produce plethora, or to weaken nervous power, and vascular tone, should also be shunned. (See art. CRISIS, for *Critical Hæmorrhage* ; and ARTERIES and VEINS, for *Hæmorrhage Symptomatic of Organic Lesions of these Vessels*.)

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HÆMORRHAGES CONSIDERED WITH RESPECT TO THEIR SEATS.

57. In treating of hæmorrhage, as regards the situations in which it takes place, I shall notice it — FIRST, *In parts which admit of the external discharge of the effused blood*, as from the skin, and from the mucous surfaces; the latter of these comprising the most important of the diseases usually denominated hæmorrhagic. — SECOND, *In serous or shut cavities, necessarily followed by a greater or less accumulation of the effused blood*.

— THIRD, *In the areolar tissues or parenchyma of the viscera*. — In discussing the particular forms of hæmorrhage according to this arrangement, due reference will be made to the vital conditions and morbid relations upon which hæmorrhages were shown, above, more or less to depend.

II. HÆMORRHAGE FROM THE SKIN. — SYN. *Hæmorrhagia per Cutem*; *Hæmatidrosis*, Plouquet; *Sueur de Sang*, Chomel.

58. DEFIN. — *An exudation of a sanguineous*

fluid from a part or the whole of the cutaneous surface, most frequently the former, without abrasion of the cuticle.

59. Hæmorrhage very rarely takes place from the whole of the cutaneous surface; and rarely even from a limited part. The effusion of blood under the cuticle, as in scurvy and purpura, &c., is different from the form now being considered, in which it is external to this tissue. — When the hæmorrhage is from the cutaneous surface, generally it assumes the form of a sanguineous sweat or perspiration. The situations to which it is most frequently limited, are — the face or cheeks, the anterior parts of the chest and armpits; the mammæ and mamillæ, the groins, the umbilicus; the palms of the hands and soles of the feet; and the heels, toes, and fingers. It may occur in these situations without any abrasion of the cuticle or change in the skin; but it also sometimes proceeds, both in these and in other parts, from cicatrices, nævi, or other alterations of structure.

60. Hæmorrhage from the cutaneous surface generally has been noticed by BEVERENIUS, TULPIUS, WEPFER, SCHENCK, GARMANNUS, RUYSCH, LENTIN, STAHL, PEZOLD, and RICHTER; and a few cases of it are given in the *Ephemerides Academicæ Naturæ Curiosorum*. I never saw an instance of it. My learned and scientific friend, Dr. W. HUTCHINSON, informed me that, during his residence in the Ukraine, he had a fine Arabian horse, whose sweat, upon most occasions of exertion, was sanguineous; and was nearly pure blood upon great exertion. It was general, and unattended by any other sign of disease. — Hæmorrhage from the face has been observed by VOGEL and PELISSON. It has occurred in rare instances during epileptic convulsions: I saw a case of this kind. Discharges of blood from the mammæ and nipples are more frequent, and have been seen by SCHENCK, AMATUS LUSITANUS, MARCELLUS DONATUS, MERCKLINUS, VANDER WIEL, PANAROLUS, PAULINI, BIERLING, HOFFMANN, SCHURIG, TRIOEN, DELIUS, RICHTER, WEGELIN, JACOBSON, and myself. Hæmorrhage from the umbilicus has occurred chiefly in young children, or during the first weeks or months of infancy. Cases of this kind have been noticed by FABRICIUS, SHUSTER, RADFORD, and others, and have generally terminated fatally. Mr. POUT has detailed a case which thus terminated, and which was the third in one family. Exudations of blood from the armpits, groins, and extremities, especially the fingers and toes, have been remarked by WEPFER, ZACUTUS LUSITANUS, MERCKLIN, HAGENDORN, ASH, MUSGRAVE, AB-HEERS, RIEDLIN, BARTHOLINUS, ORLOVIUS, WHYTT, and THILENIUS. Hæmorrhage from cutaneous nævi, and from the cicatrices of ulcers, is not an infrequent occurrence, especially in females in whom the catamenia are suppressed. In this case it assumes the form of vicarious menstruation.

61. i. Causes. — Cutaneous hæmorrhages are evidently more or less connected with the state of the constitution and of the circulation. They have been seen at all ages, and more frequently in females than in males. They most commonly appear after the suppression or cessation of accustomed sanguineous or other discharges; more especially the menstrual. When they take place from the breasts, they often recur periodically,

and replace the catamenia. They are sometimes caused by great exertion, by violent emotions, by sudden terror or fright, and by great muscular efforts. MAYER states that he saw a case in which the hæmorrhage returned twice annually, about the equinoxes upon muscular exertion.

62.ii. The *Phenomena* attendant upon cutaneous hæmorrhage have not been closely observed or described. In some cases, where the exudation was partial, pain and redness of the surface preceded it. In others, the blood has issued from a greater or less extent of the skin, in a manner similar to the perspiration, of which it seemed to constitute a part. It has varied in deepness of colour and in fluidity, as well as in quantity. Upon wiping it off, the skin has presented no change of structure, and has continued still to exude the blood from its surface. The discharge has seldom been of long duration, although it has frequently recurred. Where it has been vicarious of menstruation, and has proceeded from the mammæ, or from nævi, or from a cicatrix, increased fulness, redness, and heat of the part has generally preceded it for a short time.

63.iii. The *Prognosis* of cutaneous hæmorrhage is generally favourable, when it is partial unless it be dependent upon internal disease. When it is general, it is not unattended by danger. The soft solids and the blood itself are then generally more or less in fault; and this seems to be not less the case when it has been caused by violent mental shocks or sudden frights.

64.iv. The *Treatment* should altogether depend upon the states of vascular action and vital power; and ought to be conducted according to the principles developed above. If the hæmorrhage has followed the suppression of an accustomed discharge, the restoration of this latter ought to be attempted. If it has proceeded from fright or moral emotions, antispasmodics, restoratives, and sedatives should be administered. If it be evidently passive, and very abundant, it ought to be moderated or restrained by tonic astringents, internally and externally prescribed.

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III. HÆMORRHAGE FROM THE NOSE. — SYN.

Ἐπισταξίς (from ἐπισταζω, I flow drop by drop); Αἱμορραγία, Hippocrates; Hæmorrhagia, Linnæus, Sagar, Sauvages; Hæmorrhagia narinea, Hoffmann; Epistaxis, Vogel, &c.; Hæmorrhagia Narium, Sanguinis Stillatio, vel Stillicidium è Naribus, Auct. var.; Hæmorrhagie nasale, Saignement du Nez, Fr.; Nasenblutfluss, Germ.; Bleeding from the Nose.

65. DEFIN. — The effusion of blood externally from the pituitary membrane.

66. There is no part of the body more disposed to hæmorrhage, than the pituitary membrane; and none in which the recurrence of the discharge is productive of so little injury, as respects either this structure or the constitution. It is necessary to a due consideration of the pathological and therapeutical relations of epistaxis, to recollect, that this membrane is supplied by the external and internal branches of the common carotid arteries; and that its blood is returned partly into the external jugular veins, and partially, by anastomosing branches of veins, into the anterior veins and sinuses of the cranium. The blood effused from the pituitary membrane may be discharged either by the nostrils, or by the mouth after having passed into the posterior fauces. This latter very generally occurs when the patient is in a supine posture; it then not infrequently flows into the pharynx, and is swallowed. If the quantity of blood is great, which thus passes into the stomach, irritation of this organ, and of the intestinal canal, sometimes followed by vomiting of the blood — by a pseudo-hæmatemesis — or by melæna, not infrequently supervenes. On the other hand, blood may be discharged through the nostrils, without having been effused by the pituitary membrane. This occurs when a sudden or profuse hæmorrhage takes place from the pharynx, bronchi, or stomach; but it is not, and therefore should not be confounded with, epistaxis.

67. i. The *Phenomena* of Epistaxis are well known; but the signs of its occurrence, and the true pathological states ushering it in, are not so generally recognised or justly estimated. — A. The *precursory symptoms* vary much according to the grades of vital action, of local determination, and of general or local vascular fulness, preceding and attending it; and upon these pathological conditions entirely depend the hypersthenic, sthenic, or asthenic, — the entonic, or atonic, — the active or passive character of the hæmorrhage. In proportion as it partakes of a hypersthenic or sthenic form, the more manifestly will it be ushered in by one or more of the following symptoms; — by pain of the head or face; by vertigo, stupor, or somnolency; by frightful dreams, or restlessness; by redness or heat of one or both cheeks; injection of the eyes or lachrymation; by flashes of light before the eyes, or affections of the sight; deafness, or noises in the ears; increased strength of pulsation in the temporal or carotid arteries, and fulness of the veins; and by a sense of fulness,

tension, dryness, heat, or of titillation or itching of the nostrils. Not infrequently, especially in the more passive or asthenic states, the hæmorrhage occurs without any premonition, or merely after a slight touch or local irritation. The character of the pulse varies with the degree of vascular action and of vital power; and in proportion to the grades of both it is full, strong, and rebounding. According, also, as both action and power are weakened, the pulse becomes frequent, soft, compressible, open, small, and undulating. The older writers considered that a dicrotic or rebounding pulse indicated the occurrence of this, or of some other hæmorrhage; but no great dependence can be placed upon this symptom.

68. *B.* The hæmorrhage may take place from one or both nostrils; but in the latter case it is greater from one than the other. The quantity of blood discharged may vary from a few drops to many pounds; and, in the more obstinate passive states, the patient may be reduced to the utmost danger, or may be carried off in a few hours, or days, according to the continuance or violence of the discharge. In some cases, a fibrinous and more or less firm coagulum attaches itself to the part whence the hæmorrhage proceeds, and occasionally hangs out of the nostrils over the upper lip, or down into the posterior fauces. As long as this remains attached, the discharge continues suppressed; but when removed prematurely or otherwise, it returns, even with increased violence and danger. The disease may be *continued*, *remittent*, and recurrent, or *intermittent*. In this last case it may return irregularly or *periodically*.

69. *C.* The more active or simply *sthenic* epistaxis is often *symptomatic* or *critical* of several acute diseases, attended by increased action; especially the more inflammatory kinds of fever, and inflammations of the brain, or of the lungs, &c.—The *passive forms* are frequently *symptomatic* of several cachectic maladies; and of the last stages of malignant or low fevers.—Many writers, even as recent as the FRANKS, suppose that, in cases of epistaxis consequent upon enlargements or *obstructions of the liver*, or of the *spleen*, the hæmorrhage is generally upon the same side as the enlarged viscus.

70. *ii.* CAUSES. — *A.* Epistaxis occurs most frequently in children and young persons, especially in its more idiopathic states. It affects most commonly the sanguine, irritable, the plethoric, and florid; and those possessed of great talents, of delicate or relaxed fibres, of weak constitutional powers, and of much sensibility. After ten or twelve years of age, it is oftener observed in the male than female sex. It is not infrequent in males about the change to the decline of life; and then, as well as at later periods, often prevents more serious hæmorrhagic or inflammatory attacks. Epistaxis is also often dependent upon peculiarity of constitution or diathesis, and is consequently, often hereditary, or observed in several of the descendants of the same parents, or members of the same family.—At advanced ages, it is most common in those who live luxuriously and partake largely of wine or malt liquors. In the more mature periods of life, it is most frequently *symptomatic*, or dependent upon disease of the heart, of the liver, spleen, or of some other viscus; or consequent upon the disappearance of some sanguineous or other evacuation.

71. *B.* The *exciting causes* are extremely numerous and diversified; for whatever favours an increased flux of blood to the head, and to the pituitary membrane; or retards the return of this fluid from these parts; or occasions general plethora; or weakens the vital cohesion of this membrane, or the tone of the vessels ramified in it, may occasion hæmorrhage from it, when the predisposition already exists.—*a.* The *external causes* are—injuries; irritants or excitants inhaled into the nostrils; stimulating vapours or gases; fractures of adjoining parts; exposure of the face to fires or furnaces, or of the head to the sun's rays, either uncovered, or with a black or metallic hat or cap.—*b.* The *internal causes* are—whatever increases the flow of blood to the head, as anger, shame, or other states of mental excitement or mental disorder; protracted study, and great exertions of the mind; stooping, or a low or depending position of the head; frequent sneezing; catarrh; febrile, inflammatory, and exanthematous diseases; headachs, and rheumatic affections of the face;—whatever retards the return of blood, as deep sighs, exertions of the voice, laughing, singing, crying, &c.; playing on wind instruments; severe cough or difficulty of breathing; sudden terror; disease of the heart or adjoining large vessels; tumours pressing upon the jugular veins, or other causes of obstruction to the circulation in them, or in the subclavians; congestion of the lungs; neckcloths or collars worn too tightly around the neck, &c.;—whatever causes absolute or relative plethora, as too full living, the ingurgitation of large quantities of wine, or other exciting liquors; the suppression of accustomed evacuations, especially the catamenial and hæmorrhoidal, &c.;—whatever interferes with the equal distribution of the blood, as wearing tight clothes or corsets, obstructions in any of the large viscera, the gravid uterus, excessive distension of the stomach or bowels, or enlargement of the spleen, epileptic or convulsive seizures, cold applied to the extremities, suppression or retention of the natural discharges, and unnatural positions of the body;—whatever weakens the tone of the vessels in the pituitary membrane, and diminishes the crasis of the blood, as the advanced states of low fevers, scurvy, and other cachectic maladies, frequent returns of the complaint, &c.;—whatever determines the blood to the superficial parts of the body, as diminished pressure of the air, high range of atmospheric heat, &c. The epidemic prevalence of epistaxis (which is of very rare occurrence) may be attributed to this last cause. (See MORGAGNI, *Epist.* xiv. ch. 25.)

72. *c.* The blood is chiefly exuded from the capillaries of the pituitary membrane, as in hæmorrhages from other mucous surfaces: but the question frequently agitated, as to whether it proceeds from arterial or venous capillaries can hardly be solved; nor does it deserve the trouble of inquiry. J. P. FRANK observes, that he has frequently seen a varicose state of the veins after cases of chronic epistaxis. The more important considerations as to the pathology of the disease, are those which relate—1st, to the states of vascular action, and vital tone attendant upon it;—2d, to the constitution and habit of body of the patient;—3d, to previous attacks of hæmorrhage, either from the nose or from other parts;—4th, to antecedent and associated disorders, or to ten-

dencies to be affected by dangerous maladies, as apoplexy, palsy, hæmoptysis, phthisis, &c.; — 5th, to the causes, predisposing and exciting; — 6th, to the probable consequences of an immediate arrest, or of a continuance, of the discharge; — and, 7th, to its critical influence.

73. iii. The PROGNOSIS should have more or less reference to the circumstances just enumerated. It is generally favourable, when the disease occurs in children, or persons about the age of puberty, who are otherwise healthy; but, if epistaxis affect the cachectic, the strumous, those who have evinced a tendency to affections of the lungs, or of the glandular and lymphatic system, or those labouring under disease of the heart, lungs, or spleen, or who are aged, the prognosis ought to be more guarded, inasmuch as the hæmorrhage may be difficult to restrain; or, when arrested, it may return; or may be followed by still more serious results, as by hæmoptysis, or by an aggravation of the associated malady, or by fatal syncope upon using exertion, or assuming a sitting posture. The more sthenic the epistaxis, the less the risk from it, unless it be prematurely restrained. But when it is manifestly asthenic, and copious — if the means of cure fail, and if the blood is thin, dark, or does not coagulate — if the powers of life sink, and the skin and lips assume a pale or waxy hue, the prognosis should be unfavourable, in proportion to the prominence of these changes.

74. In persons who have arrived at, or passed, middle age, the above circumstances (§ 72.) and considerations should, especially, have due weight; and even the contingencies of the attack — whether suppressed, or allowed to continue as far as the immediate safety of the patient will warrant — ought to be fully estimated. Where disease of the heart, especially passive dilatation of one or more of its cavities, or attenuation of its structure, or a disposition to apoplexy or palsy, or engorgement of the liver or spleen, exists, an opinion of the immediate or ultimate consequences should be stated with caution. — When slight epistaxis takes place in the plethoric, or in those addicted to indulgences at table, the circumstance ought to be viewed as indicating the danger of the habit, and the probable occurrence hereafter of apoplexy or palsy, if a more spare diet and suitable regimen be not observed. In forming an opinion of the terminations of nasal hæmorrhage, the remote consequences of the continuance or suppression of it upon related organs should be considered, in connection with the causes and the accompanying phenomena. When the epistaxis appears as a salutary evacuation of an overloaded vascular system — when it has been caused by full living or intemperance, or preceded by headachs, noises in the ears, injected eyes, affections of any of the senses, &c. — the prognosis ought to have reference chiefly to the cerebral disease which it has averted; and the indications which it has evinced should not be lost upon the practitioner, nor upon the patient.

75. iv. TREATMENT. — *a.* Upon visiting a patient with epistaxis, the first glance will often enable the practitioner to decide whether or not he ought to arrest it without delay. When the countenance does not at first furnish sufficient grounds for immediate determination, inquiries ought to be made as to the age, constitution, habits, and previous ailments of the patient; the causes which

occasioned the attack; the symptoms ushering it in, and attending it; the quantity and appearance of the blood discharged; and the existing indications of internal disease; in order that a safe conclusion may be arrived at as to this and other parts of the treatment. When one or more of the following circumstances appear at all prominent — if the patient be robust or plethoric; if he have lived fully, and drank wine or malt liquors freely or daily; if he have experienced active disease in the head, or attacks of congestion, or determination of blood to this part; and if headach, redness of the eyes or face, increased heat of the scalp, throbbing of the vessels, or a beating noise in the ears, have ushered in the attack, and more especially if they still attend it; the discharge should not be arrested until the vascular system is relieved; and when this is accomplished, the epistaxis will cease of itself. If it should seem to cease prematurely, and particularly if the above symptoms still continue, depletions, purgatives, and an antiphlogistic regimen ought to be prescribed.

76. *b.* When it is desirable to arrest the discharge, the means of cure should be directed with the *intention* — 1st, of deriving the current of circulation from the seat of hæmorrhage; and, 2d, of constringing the capillaries of the pituitary membrane. With these views, the patient ought to be placed in a cool and airy apartment, with the head elevated, or held upright, and the feet plunged in warm water. The neck should be bared, and cold fluids aspersed over it and the face, or cold substances applied upon the nape, or upon the forehead. If these fail, evaporating or iced epithems may be placed over the whole of the head, or the cold effusion may be directed to this part, and an active cathartic exhibited. The most appropriate *cathartics* in such cases are calomel with rhubarb or jalap, and the spirits of turpentine with castor oil; but a full dose of the latter may be given in two or three hours after the former has been taken. — *Emetics* have been advised by STOLL; but they ought not to be given early in active epistaxis. They are most serviceable when the attack has been induced by an overloaded stomach.

77. *Bleeding* is required chiefly in the circumstances just alluded to (§ 75.), and in the more sthenic forms of the disease; but it should not be neglected, in these circumstances especially. It may be necessary to repeat it, even oftener than once, and after longer or shorter intervals. The older writers recommended bleeding from the feet; and many modern Continental practitioners order leeches to be applied to the anus or to the vulva, when the epistaxis has arisen from the suppression of the hæmorrhoidal or catamenial discharge. When it has become habitual, or periodic, and especially if it be vicarious of menstruation, the recurrence of the discharge may be anticipated by the application of leeches to the tops of the thighs near the groins; by aloëtic purgatives; by the semicupium or hip-bath; and by the exhibition of emmenagogues, especially borax, with the aloes and myrrh pill. In other circumstances, *cupping* over the nape or mastoid processes is preferable to other modes of vascular depletion. When the quantity of blood discharged is too great to admit of the loss of more, *dry-cupping* in the former situation should not be over-looked. — In the great majority of cases, however, the

sitting posture, with the head held backwards; cold applied to the face; or a piece of cold metal placed between the nape of the neck and the clothes; and cooling drinks, especially those with *acids*, *nitre*, &c.; will be sufficient to arrest the discharge.

78. *c.* When active epistaxis has proceeded so far as to require to be arrested, and has still continued, notwithstanding the foregoing means, the treatment then called for is also appropriate to the *passive* or *atonic* states of the disease. In these circumstances, the chief reliance must be placed upon astringents, applied to the pituitary membrane, and taken internally with tonics; upon pressure made locally; and upon the insufflation of substances into the nostrils, that may promote the coagulation of the effused blood. A solution of the acetate of lead, or of the sulphate or acetate of zinc, or of the sulphate of iron or of copper, or of the sulphate of alumina, or of the vegetable or mineral acids, or of the pyroligneous acid with kréosote, or of any of the numerous vegetable astringents (§ 40.45.), may be injected into the nostrils; or lint, moistened with either of them, introduced; but whilst astringents are being used locally, the exhibition of them internally should not be neglected. The superacetate of lead, with acetic acid, and small doses of opium, may be given internally; or other astringents may be taken with tonics; or small doses of spirits of turpentine resorted to, in the manner above recommended (§ 41.).

79. Finely levigated astringent powders, especially those of alum and of gall-nuts, may be blown through a quill into the nostrils; or substances of a glutinous nature may be employed in this manner, particularly powdered gums, as tragacanth or acacia; or astringents may be conjoined with these. Finely powdered charcoal may be employed in the same way. Pungent or irritating substances are often of less service than the powdered gums, which will, without exciting the Schneiderian membrane, favour the coagulation of the blood on its surface. Plugging the nostrils with lint moistened with some astringent solution, is sometimes successful; but when the hæmorrhage proceeds from the more posterior parts of the nares, it will fail, unless the lint be pushed so far backwards as to reach nearly to the pharynx. Care, however, ought to be taken that it does not irritate this part. —J. P. FRANK advises a piece of the intestine of a pig, closed at one end, to be introduced into the nostrils, and injected with a cold fluid.—Some writers recommend thick mucilage, others a paste with charcoal or with astringents, and others the white of egg, to be conveyed into the posterior nares, in order to coagulate the effused blood.—When a coagulum has formed, either spontaneously, or by any of the foregoing means, it ought not to be disturbed for three or four days, or even longer, lest the hæmorrhage return.

80. *d.* Besides the above measures, others have been advised.—In order to derive from the seat of hæmorrhage, ZACUTUS LUSITANUS directs the cautery to the lower extremities; CHRESTIEN, warm pediluvia, with mustard flower put into the water; BORELLI, bruised nettles to the feet and hands; NIEMANN blisters to the nape, and CHEZA to the arms; RIEDLIN, the exhibition of active cathartics; and CÆLIUS AURELIANUS, cupping on the occiput, GALEN on the hypochondrium,

and FORESTUS on the extremities. With the view of constricting the extreme vessels, cold drinks are prescribed by HOFFMANN; cold injections through the nostrils, by MORAND and MORGAGNI; the immersion of the head in cold water, by DARWIN; cold glysters, by LEUTHNER and ANDRIÉU; and cold applications to the genitals, by DIEMERBROECK, THEDEN, and MERCIER. In addition to the local astringents already noticed, powdered agaric is recommended by ROCHARD; writing ink, by RIEDLIN; lemon juice, by BLANKARD; and spider's web, with vinegar, by CHESNEAU. The introduction of plugs moistened with spirits of wine is directed by MORGAGNI and RATH, and with the expressed juice of the common nettle, by PRÆVOTIUS; and plugs consisting of dough, or chalk-paste, by AVICENNA and DIEMERBROECK. The injection of a strong solution of isinglass is prescribed by LENTIN; and carded lint, drawn or pushed into the posterior nares, is employed by AUDOUIN.

81. The internal use of the acetate of lead, with opium, is advised by REYNOLDS and LATHAM; of the phosphoric acid, by HERDER; of the aromatic sulphuric acid, by HUFELAND; and of the ergot of rye, by SPAJRANI, CABINI, RYAN, and NEGRI.—The first of these may be employed in either the active or passive states of the disease; but the phosphoric acid is admissible only in the latter. In passive epistaxis, camphor with opium; the spirits of turpentine, in small and frequent doses, with aromatics and restoratives; the chlorates of potash or of lime; the sulphate of quinine with camphor, &c.; assafoetida with myrrh, and opiates in small quantity (SYDENHAM), are amongst the most energetic medicines that can be taken internally; but external means ought also to be resorted to.

82. *e.* If epistaxis be vicarious of menstruation, the return of an attack should be prevented only by endeavouring to restore the catamenial discharge. If it be periodic, especially in persons who have suffered from agues, congestion or enlargement of the liver or spleen should be dreaded; and if either be found to exist, deobstruent purgatives, followed by tonics, particularly quinine or the other preparations of cinchona, or FOWLER'S solution of arsenic, ought to be prescribed; but local depletions should be freely employed previously to these, whenever the liver is the seat of such disorder. When epistaxis occurs in aged persons, either the early suppression of the discharge, or its continuance, may be followed by serious results. It is generally connected with a disordered state of the circulation within the cranium in such cases. What has been stated above will indicate the circumstances in which it will be advisable to interfere; but repeated blistering behind the ears, in some instances cupping in this situation, a seton in the nape, and other measures which the peculiarities of the case will suggest, with a suitable regimen, ought not to be neglected.

83. *f.* If the hæmorrhage from the nares seems to be *critical*, the observations offered in the article CRISIS are altogether applicable. When it appears in the last stage of low fevers, or in scurvy, or in purpura, and is merely the consequence of the lost tone of the extreme vessels, with diminished vital cohesion of the mucous surfaces, and a deteriorated state of the blood, the treatment directed for the passive form of epistaxis, or

for putro-adyamic fever, is quite appropriate, if the discharge be so considerable as to require measures to be adopted for it.

84. *g.* The *after-treatment* of epistaxis is often of great importance, especially in persons of middle or advanced age. An attack, whether slight or severe, in those who live fully, ought to be followed by an antiphlogistic regimen. Where the discharge has prematurely ceased, bloodletting should always be prescribed. In order to derive permanent advantage from this treatment, abstinence, regular exercise in the open air, and a due subjection of the mental emotions, ought to be constantly observed. How fatally this may be neglected, is shown by the following case:—A gentleman, aged about 50, of a very full habit of body, accustomed to live richly, and to take his wine freely, but not in excess, became subject to severe headaches. He afterwards had an attack of epistaxis, which continued until the loss of blood was very great, although means were used to arrest it. He recovered, and remained well for many months; yet his usual diet and regimen were persisted in. His headaches, as may have been expected, returned; he became depressed in spirits, and disliked society; but no appropriate treatment was prescribed—or, at most, aperients only were directed. The indications furnished by the epistaxis were entirely lost upon the patient and his medical attendants—abstinence was not adopted by the former, nor precautionary bloodletting by the latter. The consequences may be readily anticipated. He shortly afterwards was struck with apoplexy associated with hemiplegia; for which I was consulted just before his death.—This is, however, not the only instance of the kind which has come before me in practice. I could state the particulars of several cases in which the neglect of the indications afforded by epistaxis, has been followed by apoplexy, palsy, epilepsy, mania, and inflammation of the brain and its membranes.

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IV. HÆMORRHAGE FROM THE MOUTH AND THROAT. — SYN. Hæmorrhagia Oris, H. Fau-cium, Stomatorrhagia, J. P. Frank; Sanguinis Profluvium ex Ore, Hæmorrhoides Oris, Vogel; Hæmorrhagie buccale, Fr.; Mundblütfluss, Germ.

85. *A discharge of blood from one or more of the parts forming the mouth and throat.*

86. Hæmorrhage may take place to a great, or even fatal, amount, from the gums, the tongue, the fauces, or the pharynx; and even from the insides of the cheeks and lips. Blood is rarely, however, discharged from one or more of these parts, unless in the advanced stages of cachectic diseases, or of malignant or low fevers. — *a.* RIVERIUS mentions a case in which four or five pounds of blood were discharged from the lips every month. Hæmorrhage from this part has been observed also by ZACUTUS LUSITANUS. J. P. FRANK met with a case in which it proceeded from varicose veins of the upper lip. I lately saw an instance of varicose veins of this part, but there was no hæmorrhage. Bleeding from the interior surface of the cheeks is generally owing to injury from the teeth, or to tumours.

87. *b.* Discharges of blood to a small amount from the gums are very common, especially in the advanced stages of the diseases just adverted to; and more abundantly after suppression of accustomed discharges, as the catamenial or hæmorrhoidal. Vicarious menstruation may even take place from this situation. Severe or dangerous hæmorrhages from the alveolar processes have been most frequently caused by the extraction of teeth. FRANK has seen several pounds of blood lost from a varicose state of the veins of, and in the vicinity of, the gums: and similar discharges have more frequently taken place from tumours in this situation, and from the excessive use of mercury. VOGEL met with an instance in

which the discharge was produced by a combination of mercury and belladonna. HIRSCH, FRANK, and others, have met with periodic hæmorrhage from this part, vicarious of menstruation. Fatal effusions from the gums have been seen by HORSTIUS, FABRICIUS HILDANUS, and several more recent writers.—The occurrence of hæmorrhage in this situation in purpura hæmorrhagica, scurvy, and the diseases adverted to above (§ 86.), is too well-known to require further notice.

88. c. Hæmorrhage from the *tongue* very rarely takes place to any very considerable amount, unless in cases of injury of the raninal veins or arteries, as in dividing the *frænum linguae*, when it may prove fatal. Slighter injuries from the teeth, especially during epileptic fits, seldom cause more than small discharges of blood. But the more serious diseases to which the tongue is liable (see art. TONGUE) may be followed by dangerous or even fatal hæmorrhage. Such instances are recorded by PLATER and others. MARI saw 24 lbs. of blood discharged from this part; and J. P. FRANK met with a case of *glossitis*, which, upon passing into gangrene, terminated fatally with profuse hæmorrhage.

89. d. Hæmorrhage from the *palate* and *fauces* to a very considerable amount has been observed by BUNDL, VOGEL, FRANK, and KLUIGE. J. P. FRANK believes it generally to proceed from a varicose state of the veins in this situation; and hence the appellation, *Hæmorrhoides Oris*, applied to it by VOGEL and BUNDL. He mentions an instance in a young man, who, for many years, suffered repeated attacks of hæmorrhage from this state of the veins of the palate; and who was permanently cured, after a profuse discharge, by a strong solution of alum. PORTAL met with a case where the hæmorrhage took place from the *uvula*.—A more or less copious effusion of blood may also proceed from the *velum palati* or *tonsils*, especially in the course of cachectic diseases, or as a consequence of a varicose state of the veins of the part, or of those in the vicinity.

90. e. Effusions of blood from the surface of the *pharynx* occur more frequently than is commonly supposed, and are overlooked in consequence of the fluid having passed into the stomach. When the hæmorrhage from this situation is very considerable, the quantity of blood which is swallowed is often so large as to cause vomiting, and to lead to the supposition that the stomach is the seat of the disease. The small veins in the pharynx are not infrequently varicose or obstructed; and when this is the case, hæmorrhage sometimes takes place from comparatively slight causes. The most dangerous discharges from this part occur in the advanced stage of putro-adyamic fevers, and of cynanche maligna, in which the pharynx is more or less affected. J. P. FRANK has noticed the occasional supervention of pharyngeal hæmorrhage independently of those diseases: but the subject has been overlooked by other writers. Some years ago, I attended a lady, about 70 years of age, residing at St. John's Wood, who complained of dyspeptic disorder complicated with psoriasis and sore throat. The veins of the pharynx were reticulated and varicose. I was afterwards called to her suddenly on account of a very severe hæmorrhage, attended by vomiting and cough. Much of the blood evidently was brought up

from the stomach, but a great part passed directly from the throat. The cough arose from the irritation caused by the fluid on the epiglottis and pharynx. The effusion was arrested for a time by powerful astringents. Two days afterwards, the hæmorrhage returned more violently than before, and terminated life before I reached her. On examination after death, the pharynx was found softened, black, and studded with soft aphthous ulcerations, between which dark blood was infiltrated. The veins of this part were numerous and dilated. The stomach contained a considerable quantity of blood. The upper part of the œsophagus was softened and congested in its internal surface. In this case, the blood had passed into the stomach, the position in bed having favoured this occurrence, and had irritated this organ so as to produce vomiting.

91. i. The SYMPTOMS and DIAGNOSIS of hæmorrhage from the mouth or throat are not always as distinct as may be supposed, particularly as respects the source of the discharge. The symptoms preceding the effusion are very uncertain; and are those most commonly indicating congestion of the head or adjoining parts, or disease in one or other of the above situations. Headach, vertigo, noises in the ears; soreness, irritation, titillation, tension, or a sense of fulness or heat in the throat; a bloated appearance of the countenance, and throbbings of the vessels in the vicinity, sometimes usher in the hæmorrhage. If the patient be in bed when attacked, the irritation of the fluid on the glottis causes *cough*; and the passage of it into the stomach is followed by *vomiting*, when the quantity is considerable, or the stomach irritable. If hæmorrhage take place from the pharynx whilst the patient is asleep, the blood will flow into the stomach; and the first intimation of the occurrence will often be the vomiting of blood. Hence the utmost care is required to distinguish this species of attack from *hæmoptysis* on the one hand, and from *hæmatemesis* on the other, as it may closely simulate either. In order to do this, the mouth ought to be well washed by a slightly astringent and colourless fluid, or the throat gargled, and afterwards carefully examined. If the hæmorrhage be too copious to admit of inspection of the mouth and throat, the patient should lean forwards, so as to allow the blood a free passage from the mouth; and if it flow without coughing or retching, and is neither frothy or very florid, nor very dark or grumous, there can be no doubt as to the situation whence it proceeds. If the patient feel it collect in the throat, and create a disposition to deglutition, or if he require no effort to bring or hawk it up, it manifestly proceeds from the fauces or pharynx.—In many instances, causing the patient to drink some fluid instantly before examining the throat will assist the diagnosis; and in others, the history of the case will be sufficient to settle the question.—When the fauces or pharynx is the seat of the discharge, deglutition of food or drink, or the use of a gargle, either before or during the hæmorrhage, will cause more or less pain. (See *Diagnosis* of HÆMOPTYSIS and HÆMATEMESIS.)

92. ii. The CAUSES of stomatorrhagia are those of hæmorrhages generally; but more especially, previous diseases of a cachectic or malignant character; affections of the gums and teeth; repeated attacks of sore throat, particularly when connected

with chronic disorder of the stomach and other digestive organs; the use of mercury; injury or previous lesion of the vessels, especially the veins; and obstructed discharges, as the catamenial or hæmorrhoidal, of either of which, the hæmorrhage from the mouth may be vicarious.—The acronarcotic poisons may even cause it. In a case of poisoning by aconitum, which I saw some years ago, remarkable swelling of the tongue and fauces took place, followed by moderate hæmorrhage from these parts.

93. iii. The PROGNOSIS entirely depends upon the circumstances in which stomatorrhagia occurs—upon the previous state of disease, and upon the quantity of blood lost, and the effect thereby produced upon the constitution. The general principles above stated will also guide the practitioner.

94. iv. The TREATMENT of hæmorrhage from the mouth or throat requires to be materially modified, according to the parts from which the blood is effused, and the causes producing the effusion. Cases rarely occur, in which it is either necessary or proper to have recourse to bloodletting. Purgatives, however, especially those of a stomachic or tonic kind, are often beneficial—more particularly when the disease is connected with disorder of the digestive organs, and with accumulations of morbid matters in the *prima via*. The chief dependence is to be placed in the local and internal use of the more energetic astringents noticed above—as the sulphates, the acetic acid with kréosote, the acetate of lead or of zinc, spirits of turpentine, the chloride of lime, &c. These may be used in gargles—in more or less concentrated solutions—and in various states of combination, as with gums or mucilages. If the hæmorrhage take place from a single vessel, or from a limited extent of surface, the actual or potential cautery is quite appropriate. If it proceed from the alveolar process, powerful styptics, and various mechanical measures, may be resorted to.

95. When hæmorrhage from the mouth depends upon general cachexia, or supervenes in the latter stages of putro-adyamic fever, or of purpura or scurvy, the above means should be aided by the internal use of tonics, conjoined with vegetable or other astringents and antiseptics, as the chlorides, the chlorate of potash, the nitrate of potash, or the muriate of ammonia, &c., and by an appropriate regimen.—If the effusion seems to proceed from the pharynx, the position of the patient should be such as will favour the flow of the blood from the mouth, and prevent it from irritating, or escaping into, the larynx.

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V. HÆMORRHAGE FROM THE RESPIRATORY ORGANS.—SYN. *Hæmoptysis* (from αἷμα, blood, and πτύω, I spit, or πτύσις, a spitting); αἱμοπτύσις? αἱμοπτύτιος, Galen, Dioscorides; *Sanguinis Sputum*, Celsus; *Emoptoë*, Gordon; *Sputum Cruentum*, *Cruenta Expuitio*, *Sanguinis Fluor*, *Vomitus Pulmonis*, Auct. Lat.; *Emoptoïca Passio*, Gilbert; *Passio hæmoptoïca*, Plater; *Hæmoptoë*, Boerhaave, Vogel, Darwin; *Hæmotismus*, Auct. var.; *Hæmoptysis*, Sauvages, Vogel, Cullen, &c.; *Hæmorrhagia Pulmonum*, *Hæm. bronchica*, *Hæmorrhæa pulmonalis*, Auct. var.; *Pneumonorrhagia*, J. P. et J. Frank; *Blutspeyen*, *Bluthusten*, *Lungenblutfluss*, Germ.; *Crachement de Sang*, *Expectoration de Sang*, Fr.; *Emotisi*, *Emotisea*, *Sputo di Sangue*, Ital.; *Blodspytting*, Dan.; *Pulmonary Hæmorrhage*, *Spitting of Blood*, *Coughing of Blood*.

96. DEFIN.—*After a sense of heat, oppression, or pain in the chest, and titillation in the throat, the rejection of florid, frothy, or pure blood, from the bronchi or lungs, with a hawking or short cough.*

97. *Hæmoptysis* is one of the most frequent varieties of hæmorrhage, owing to—(a), the very extensive bronchial and vesicular surface to which the blood is circulated for the purpose of undergoing the requisite changes during respiration; (b) to the delicate conformation of the capillaries and mucous membrane of this part; (c), to the liability of the lungs to congestions, from impaired organic nervous power, from obstructions of the pulmonary veins and of the circulation through the left side of the heart, and from tubercular or other lesions of the substance of the lungs; (d), and to the liability of this organ to derangements of its circulation from hypertrophy and other lesions of the heart, and from alterations of the large vessels.—Of all these morbid causes and connections, tubercular formations in the lungs are the most common, either as a cause of the hæmoptysis, or as associated lesions consequent upon the same antecedent changes in the states of vital power and vascular action, or as both.

98. i. SYMPTOMS, &c.—A. The premonitory signs of hæmoptysis are—horripilations, passing redness and heat of the face, or flushings of the cheeks, headach, coldness of the extremities, with a collapsed or empty state of the veins of the surface; lassitude, and sense of weight of the limbs; occasionally cramps or spasms of the lower extremities; a feeling of internal warmth, particularly in the chest; pain or tension at the epigastrium or hypochondria; a burning sensation under the sternum, with more or less anxiety, inquietude, constriction, or oppression at the chest, or dyspnœa; a short, dry cough; dyspnœa, or shortness of breath, on slight exertion; a dull pain or soreness under the sternum, between the shoulders, or beneath the clavicles; palpitations; a quick, hurried, or excited pulse, which is sometimes also hard, full, bounding, or oppressed, &c.; flatulence, or horborygmi, costiveness, and pale urine. A few only of these symptoms, or several variously modified, may be present in individual cases; they may exist for a longer or

shorter time before the attack. In some instances, neither cough, nor difficulty of breathing, nor any symptom referrible to the chest, has been complained of; or it has existed in so slight a degree as to escape the observation of the friends of the patient; and yet the most extensive changes had taken place in the lungs, and caused the hæmorrhage. A case of this kind was attended by Mr. BUSHELL, Dr. CLARK, and myself, whilst this article passed through the press. Such instances, however, are not uncommon, as shown by RHODIUS, MÜLLER, WEDEL, GRAMBERG, the FRANKS, LOUIS, CLARK, and others.

99. *B. Progress.*—As the blood rises to the larynx, a sense of titillation is felt in the trachea, or of irritation in the throat, with dyspnœa; and a gurgling or bubbling sensation in the chest or trachea; and the blood is either hawked or coughed up, exciting a sweetish-salt taste. As soon as this occurs, much alarm is sometimes caused, particularly in delicate or nervous persons; and several of the general symptoms, particularly those connected with the action of the heart and pulse, are owing chiefly to this circumstance. When the blood is in considerable quantity, the discharge of it is attended with a feeling of suffocation; the chest is forcibly dilated, a convulsive reaction or cough follows, and this fluid is ejected from both the mouth and nostrils. In some instances, the irritation at the top of the pharynx, and in the fauces, excites retchings; and in others, the blood, as it collects in the pharynx, is instinctively swallowed; and, when it has accumulated in the stomach, causes vomiting; and gives rise to a suspicion, from this circumstance, and from the presence of portions of ingesta, &c. as shown hereafter (§ 118.), that the hæmorrhage is seated in the stomach. Occasionally the blood is brought up without any effort whatever, beyond a strong expiration, which it accompanies in a full stream; and when retching or full vomiting is occasioned in the manner just stated, another and often a greater discharge of blood from the lungs attends it.

100. The quantity thus discharged, varies from a few drops to many pounds. RHODIUS (*Obs. cent. ii. 31.*) saw 23 lbs. lost in three hours; PEZOLD (*Obs. Med.-Chir. No. 49.*) and ZACCHIROLI (*WEIGEL'S Ital. Biblioth. b. iii. p. 154.*) observed larger quantities during a much longer period. J. FRANK (*Prax. Med. &c. ii. 2. l. p. 417.*) had a patient who lost 192 ounces in twenty-four hours; and a friend of my own experienced nearly as great a discharge in the same time, and afterwards recovered. When the blood is not considerable as to quantity, it is frothy or contains bubbles of air, and is of a florid hue; when it is very abundant, it is fluid, generally more or less florid, but not frothy: it is seldom mixed with muco-puriform matter, unless it be small in quantity, and it then is often semi-coagulated, and of a darker or brownish tint; but, towards the termination of an attack, this appearance is very common.—If the hæmorrhage is very great, extreme faintness, or even full syncope, may come on: but a sense of depression, or sinking, with a quick, sibilous, and short respiration; a small, weak, interrupted voice and speech; and coldness of the extremities; are more commonly complained of. Occasionally, the least exertion of the voice, or of the

body, or a fit of coughing, increases or brings back the discharge; but as often it returns without any such cause.

101. In some instances, the attack is followed by great frequency of the pulse, and generally excited vascular action, with heat of skin, thirst, &c.; although the pulse had been perfectly natural before or at the time of seizure. In these, the congestion of the substance of the lungs connected with the production of the hæmoptysis has passed into inflammatory action, in one or several parts of the organ; or rather, the infiltration of a portion of the effused blood through the smaller bronchi has excited inflammation of them, as demonstrated by the stethoscope and by dissection. In many cases, especially when the hæmorrhage occurs in weak or lax frames, and scrofulous or tubercular state of the lungs, not only the external discharge of the blood, but also its passage along the bronchi into the more depending parts of the organ, and even its infiltration into the substance of the lungs, or its effusion in the distinct form of pulmonary apoplexy, takes place, as I have several times recognised during life, and ascertained afterwards by dissection.

102. An attack of hæmoptysis may be so severe and sudden as to suffocate the patient before a large quantity of blood is lost; or so continued as to destroy life by the loss of this fluid. Only one violent seizure may occur—the patient recovering perfectly, without suffering materially, after the immediate effects have passed off: but this is seldom the case; more or less disease of the lungs, although unapparent to the friends previous to the attack, following rapidly afterwards. In some instances, particularly when tubercles have proceeded to softening, &c. without exciting much disorder, the hæmorrhagic congestion, infiltration, and atonic inflammation of the substance of the lungs, attendant and consequent upon the seizure, soon destroys life. In several instances to which I have been called, the patients had pursued their usual avocations unconscious of ailment, been attacked by hæmoptysis, and died in three or four weeks afterwards in consequence of these associated lesions of the lungs. In the case above alluded to (§ 98.), death took place 26 days after the attack. More frequently the hæmoptysis is followed by pulmonary consumption in a much less rapid form. When the blood is ejected in small quantity, or of a brown colour, or is mixed with a rose-coloured lymph, or mucus, latent inflammation or active congestion most likely will be found to exist in the substance of the lungs; and this inference ought not to be doubted, if febrile symptoms, with cough, be present, or if the blood taken from the arm be buffed.—In a few instances, the lymph effused from the vessels towards the close of the attack, is moulded into the form of several bronchi, and is expectorated in this state; in others, cretaceous or other earthy concretions, consequent on the degeneration, or the partial absorption, of tubercles, or even ossific matters, are brought up with the blood, or soon afterwards; but most frequently, and especially when the hæmorrhage is scanty, or towards its close, or after more than one attack, muco-puriform matter, with or without minute portions of softened tubercular substance, may be detected; and these become more manifest as the blood disappears.

103. Hæmoptysis may recur at irregular, or even at distant, periods; the patient experiencing but little ailment in the intervals, or presenting merely a marked susceptibility to congestion or inflammatory affections of the lungs. When supplemental of suppressed or retained catamenia, or of the disappearance of hæmorrhoids or epistaxis, it sometimes returns periodically. In such cases, the evacuation depends more upon vascular plethora, than upon serious lesion of the substance of the lungs, although this may also exist.—Some instances of a constitutional recurrence of hæmoptysis (§ 49.) have been observed, and yet a far advanced age has been reached.

104. *C. The appearances after death* comprise almost every lesion to which the lungs, heart, and large vessels are liable, but some of them are more immediately connected with hæmoptysis than others.—*Tubercles* are the most common of all these, in one stage or other of their progress, and frequently they are found in every stage even in the same case—either disseminated through the lungs or clustered—in a crude, softened, and ulcerated state—in connection with small or large excavations,—in some instances, the seats of the softened and partially absorbed tubercular matter containing earthy or cretaceous concretions; and, in rarer cases, the parenchyma of the lungs around them presenting a cicatrised or puckered appearance. When hæmoptysis has been very recent, the lungs are frequently more or less congested, and their substance infiltrated with dark blood, both throughout many of the minute bronchi and cells, and in the connecting cellular or parenchymatous tissue, large portions of the organ exhibiting a spleen-like appearance. In some cases, portions of the lungs are more or less obviously inflamed; the inflammatory appearances having been either antecedent to, or consequent upon, the hæmorrhage, most frequently the latter. In rarer instances, blood is effused in the substance of the organ, forming a distinct cavity filled with coagulated blood.

105. Adhesions between the pulmonary and costal or diaphragmatic *pleura*, both old and recent, frequently exist. The bronchial membrane is generally injected, congested, and of a deep or dark red, or purplish or nearly black, either throughout a large extent, or in parts or patches; but the state and colour of this surface vary with the period at which hæmoptysis took place, and the mode in which the disease of the lungs terminated the life of the patient. (See art. BRONCHI, § 3—14.) In rarer cases, gangrene of portions of the lungs, or erosion or ulceration of one or more vessels connected with softened tubercles or cavities, is observed. These cavities are generally lined with a more or less thick secreting membrane. In a few instances, osseous deposit has been found in the membrane of the cyst. (See art. LUNGS.)

106. Alterations of the large vessels in the chest, and of the heart itself, are occasionally found, especially in the cases of aged persons. The pulmonary veins have been seen diseased, inflamed, or partially obstructed by humours, or morbid depositions, either externally or internally. I found them inflamed, and a large branch partially obstructed by lymph, in one case. A dilated or varicose state of the pulmonary veins has been noticed in connection with hæmoptysis,

by MORGAGNI, GILLIBERT, PORTAL, and J. FRANK. Lesions of the pulmonary artery have also been met with, especially *rupture* (MATANI, *De Aneurism. Præcordior. Morbis*, p. 120.) and aneurismal dilatation (J. FRANK, &c.). Mr. SEMPLE has detailed a case, which he considered hæmatemesis, but which was probably hæmoptysis attended with vomiting, owing to the circumstances above pointed out (§ 99.), wherein the left pulmonary artery was obliterated, and the lung was extensively diseased. Aneurisms of some part of the aorta opening into the trachea, bronchi, or lungs, has been oftener observed than these. CRUICKSHANKS found the lymphatics of the lungs turgid with blood, absorbed from the air-cells, in patients who had died of hæmoptysis.

107. Diseases of the heart, particularly such as occasion obstructed circulation through the left cavities, as narrowing of the auriculo-ventricular opening, lesions of the valves, &c., are not infrequently found in connection with hæmoptysis (WILSON, WATSON, &c.). Hypertrophy of the ventricles, especially of the right ventricle, has been remarked, in rare instances. BERTIN, BOUILLAUD, and other French writers, attach considerable importance to this lesion as a cause of the hæmorrhage; but I agree with Dr. WATSON in considering the alterations which obstruct the passage of blood from the lungs as more frequent causes than this.

108. ii. CAUSES.—*A. The Predisposing Causes* of hæmoptysis comprise most of those already enumerated in connection with *hæmorrhage generally* (§ 21.), and of those which favour the formation of *tubercular consumption*. (See that article.) Those which are more especially concerned in the production of hæmorrhage from the respiratory organs are—Hereditary constitution; the scrofulous and the hæmorrhagic diathesis; sanguineous, irritable, and sanguineo-irritable temperaments; a plethoric habit of body; the period of life between seventeen and thirty-five; tallness of stature; a narrow or deformed chest; curvatures of the spine, rickets, or severe hooping cough in early life; sedentary occupations, especially at the writing-desk or drawing-table; a change of modes of life, as from active employments to inactivity; certain trades, as shoe-making and weaving; the spring and summer seasons; sudden or frequent vicissitudes of temperature and weather, especially rapid changes from cold to heat; suppression of accustomed excretions and discharges; and congestions or enlargements of the liver or spleen. M. LOUIS found hæmoptysis to occur among men nearly in the same proportion at all ages. GALEN, STRAMPIN, GOLTZ, and LOUIS, consider it to be more frequent in females than males. FRANK and CONRING entertain a different opinion; the latter remarks, that men are more prone to the disease than females, unless when the catamenia of the latter are suppressed. LOUIS found it more frequent in females in the proportion of three to two, and that their age was most commonly from 40 to 65. I believe that the predisposition to hæmoptysis is less, or at least not greater, in females than in males, until the period at which menstruation usually ceases; but that, after this period, the frequent occurrence of vascular plethora favours the production of pulmonary hæ-

morrhage. There is no doubt of the influence of premature and excessive venereal indulgences, and more especially of solitary vices of this kind, in favouring the occurrence of this and its allied diseases.

109. *B.* The *Exciting Causes* are chiefly external injury; fracture of the bones of the thorax; wounds of the chest and lungs; falls or concussions on the chest; physical efforts, particularly in lifting or carrying great weights; compression of the thorax by strait-lacing, &c.; running, especially against the wind, and hunting; protracted exercise with the arms, great exertions of the voice, reading aloud, or speaking for a long time; playing on wind instruments; inhaling irritating fumes, as those of acids, &c., or particles of dust, as in various occupations (see art. *ARTS and EMPLOYMENTS*, § 40.); foreign bodies fallen or drawn into the trachea and bronchi; cold in any form or mode of application; rarefaction, or great dryness of the atmosphere; the suppression of other sanguineous discharges; anger, and the more violent mental emotions; venereal excesses; terror, frightful dreams, or sudden surprise; severe fits of cough, of laughter, or of sneezing; straining at stool; and changes in the state of the blood. Besides these, many of the lesions just mentioned (§ 104. *et. seq.*) act as exciting causes, especially tubercles and their consequences; alterations of the vessels either in the seat of hæmorrhage, or near the centre of circulation; and difficult or impeded passage of blood through the heart, pulmonary vein, or aorta, &c.

110. *C.* The *seat of hæmorrhage*, in cases of hæmoptysis, has not always been recognised with precision. Previous to the writings of BICHAT, the effusion was very generally supposed to proceed from a ruptured or ulcerated vessel, arterial or venous. Subsequently it has been generally referred to exudation from the capillaries of the bronchial membrane. I believe that at present it is too exclusively imputed to this source; and that, although this is much the most common mode of its production, it not infrequently proceeds from an ulcerated or diseased vessel, particularly when the discharge is sudden, very copious, or rapidly fatal.—It has been supposed by some, that the blood is exuded from the general surface of an ulcerated cavity, when this lesion has preceded the discharge. This may possibly be the case in a very few instances; but, when the cavity is the seat of hæmorrhage, one vessel, or a few only, are most likely its source. In most of the cases of hæmorrhage, in connection with cavities in the lungs, that I have seen, the internal surfaces of these cavities, or fistulous ulcers, appeared not in a state indicating that hæmorrhage either had, or could have, taken place from them. The circumstance of the small bronchi being filled with blood, or their membrane being deeply tinged, or even injected or inflamed, is no proof of the discharge having taken place from them, as the blood, when once effused, even as high up as the trachea, will frequently gravitate or pass downwards into the minute air-vessels, especially when the lungs are in a state of disease or of debility, and will discolour, irritate, or even inflame them.*

* This, as well as other points connected with hæmoptysis, are very justly stated by the elder FRANK:—"Si multus, et ex vasis conspicuis, majore cum impetu cruor

111. J. P. FRANK has endeavoured to establish a variety of hæmoptysis under the denomination of tracheal, from its seat. Admitting the occasional occurrence of hæmorrhage from this situation, it rarely can be distinguished from other states of the disease, even with the aid of percussion and of auscultation; for, as this very able and practical writer has shown with great truth and originality, a considerable portion of the blood effused in this situation passes down into the bronchi, and gives rise to the same phenomena as depend upon the more common forms of the malady. This, however, he concedes. In cases, also, of profuse hæmorrhage from the pharynx or parts adjoining, a portion of the blood may escape into the trachea, descend into the bronchi, and afterwards be coughed up, thereby simulating hæmoptysis. The blood may thus pass into the lungs as well as into the stomach (§ 91. 99.), and may either be coughed up, or both coughed or vomited up, thereby simulating true hæmoptysis; or, if the quantity be great, it may suffocate the patient. Dr. WATSON mentions a case which he saw, in which suffocation occurred from the passage of blood into the respiratory passages, from an ulcerated opening into one of the lingual arteries, the bronchi containing a considerable quantity of this fluid. From the foregoing, therefore, it may be inferred, that the blood in true hæmoptysis proceeds from one or other of the following sources:—1st, From the mucous membrane of the bronchi—*Bronchial hæmorrhage*.—2d, From the substance of the lung, constituting the pulmonary apoplexy of LAENNEC, or, more correctly, *Pulmonary Hæmorrhage*.—3d, From an ulcerated or tuberculous cavity, one or more vessels having been eroded or ruptured.—4th, From aneurism of the aorta, or of some other artery.

112. *D.* *Certain Pathological Relations of Hæmoptysis* have been very generally overlooked by writers on this and other pulmonary diseases.—*a.* The intimate connection, however, existing between it and *tubercles in the lungs* has been very diligently investigated by LOUIS, ANDRAL, and others. ANDRAL refers to cases of hæmoptysis in which there appeared to be no evidence of the previous existence of tubercles in the lungs. Such cases are rare, and are to be referred chiefly to extreme congestion of the lungs. Instances are certainly not infrequent, of the hæmorrhage occurring in a state of apparent health; but, in many of these, tubercles in an early stage of their existence may have previously been formed, or even have been detected upon close examination.

in bronchium ruit; ex hoc, in alia, vicina, altiora, asurgit; ex istis, per ramos bronchiorum laterales, declives, in subjectam pulmonis affecti, aut etiam in sani, substantiam descendit, ac novo reflexu, sub summæ anxietatis ad præcordia sensu, violenta diaphragmatis actione, sed interdum *sine tussi* manifesta, et per solam quasi expirationem fortiolem, torrentis adinstar, per tracheam, laryngem, per oris, et narium per ostia, tam fluidus ac floridus, quam partim concretus, obscurus, horrendo spectaculo præcipitat. Sub tanto cruoris ad fauces impetu, pars ejus, in pharyngem regurgitans, vomitum, ut vidimus, violentum sæpe provocat, cibosque, forsitan ventriculo contentos, novæ sanguinis undæ, per tracheam simul expulsæ, commistos, expellit, ac validum medico, tussis ipsum aliquando per vomitum cruentum excitatæ, non ignaro, quo demum ex cavo sanguis scaturiat, dubitandi argumentum relinquit. Hæc dubia non minus in casu, quo tussis violenta prævit, ac, istius ob impetum, sanguis non modo pulmonum, sed simul narium e vasis expellitur, urgebunt; aut facile pulmo, ob nares cruentas, profluvii insons, cum magno judicii errore, declarabitur." *De Curand. Hom. Morb. &c.* class v. ord. iii. gen. 3. § 606.

BAILLOU remarked that profuse hæmorrhage from the lungs is less dangerous than small, and there is much truth in the observation; but PORTAL went too far in saying, that those who habitually spit blood are rarely phthisical. My own observation is more in accordance with that of LOUIS, who states that, with the exception of some cases in which hæmoptysis depends upon external injury, or is connected with suddenly suppressed catamenia, it indicates with very great probability the presence of tubercles in the lungs. Dr. JAMES CLARK, in his able work, observes that hæmoptysis is occasionally idiopathic, or dependent upon a temporary plethora or congestion of the lungs, especially when it is a consequence of suppressed sanguineous discharges. In tubercular phthisis, congestion of portions of the lungs, or even of the whole of the organ, is not infrequent, and is, in many cases, followed by a more or less copious hæmoptysis. Such congestion may also develop tubercles, or hasten their progress, as well as occasion the effusion of blood. In some instances the discharge will afford relief to all the pulmonary symptoms, especially when the effused blood is entirely thrown off; but, in others, it will accelerate a fatal issue, particularly when a portion of it remains in the bronchi, and irritates them, as shown hereafter (§ 114.).

113. It has been supposed by ANDRAL and others, that hæmoptysis occasionally is a cause of phthisis, the blood effused into the lungs forming a matrix for tubercular deposits. But to produce this effect the effusion must take place in a scrofulous constitution. I agree, however, with Dr. JAMES CLARK in considering hæmoptysis rarely to be a cause of phthisis, unless by the debility it induces when very copious, or by the depletion employed to suppress it; or still more probably by the irritation produced by the effused blood in the minute bronchi. It is a frequent symptom during the whole course of phthisis, and may appear at any stage. LOUIS states that it was present in some degree or other in two-thirds of his cases. It is rare in the phthisis of children and old persons, and occurs generally towards the close of the disease.

114. *b.* The connection between hæmoptysis and *inflammation of the lungs*, has been very generally overlooked. The former occurs in very rare cases as a termination or crisis of the latter; but when the inflammation is associated with tubercles, the development of these is frequently promoted by the hæmoptysis. One of the most common consequences of hæmorrhage into the bronchi is inflammatory action. The effused blood irritates the mucous membrane of the bronchi, especially in the minuter ramifications, and the morbid action often extends to the air-cells and substance of the lungs. This is very frequently observed in weak and susceptible constitutions, and when the effused blood has been imperfectly excreted from the bronchi. The softening and discolouration of the bronchial surface, generally seen in fatal cases of hæmoptysis, arise from this consecutive inflammatory irritation; and the puriform matter sometimes poured into the bronchi, with or without fibrinous concretions, or a coloured lymph, proceeds from the same source. A part, doubtless, of the fibrinous matters arises from the effused fluid; but a part also consists of the lymph given out by the capillaries, which

had shortly before discharged blood. — In all cases, therefore, of hæmoptysis, it is not merely the development of accelerated progress of tubercles which is to be dreaded, but also the supervention of circumscribed or diffused *pneumonia*, which may assume any of the forms described in *Inflammation of the LUNGS*.

115. *c.* The relation of hæmoptysis with *disease of the heart* has been already alluded to. The momentum caused by hypertrophy of the right ventricle is rarely sufficient to rupture any branch of the pulmonary artery, although it may probably overcome the resistance opposed by the tonicity of the extreme capillaries in the bronchial surface, or in the substance of the lungs. Dr. WATSON, who has taken a very sound view of this, as well as of some other subjects connected with hæmoptysis, states that every instance of pulmonary hæmorrhage dependent upon organic disease of the heart which he had observed, coincided with disease on the left side of that organ, mechanically obstructing the return of blood from the lungs. The obstacle has sometimes been placed at the entrance of the aorta, but it has most commonly consisted of narrowing of the left auriculo-ventricular orifice, and a rigid condition of the mitral valve. Facts illustrative of this relation have also been adduced by Dr. WILSON (*Med. Gazette*, vol. vi. p. 25.); and observed by myself. I believe, moreover, that those powerful mental emotions, which affect suddenly the functions of the heart — which seriously disturb its action and favour congestion of its cavities, as terror, fear, anger, grief, &c. sometimes produce hæmoptysis by impeding the return of blood to the right side of this organ.

116. *B. Other complications* beside the above occasionally present themselves in practice; but, in these, hæmoptysis is merely a symptom, arising from some predisposition to pulmonary or hæmorrhagic affections. — *a.* It has been stated that bronchitis and pneumonia often follow hæmoptysis, and the reason has been assigned (§ 114.). But the *complication* of acute or sub-acute *pneumonia* with slighter forms of this disease, has been very generally overlooked, especially by recent writers. STOLL and BROUSSAIS, however, have remarked that hæmoptysis sometimes accompanies, or is an accidental symptom of, pneumonia. The remark is just. Care, therefore, should be taken to recognise this state, as well as to distinguish between both diseases; as the use of astringents, on the supposition that the patient is suffering the former affection only, might lead to fatal results. Even with the aid of auscultation, the existence of the pneumonia may not be ascertained, as the auscultatory signs may be ascribed to the infiltration of the bronchi, or of the substance of the lungs, with the effused blood, or to the attendant congestion. The rational symptoms in this case should be carefully weighed; and where there are dyspnœa, cough, oppressed or quick breathing, heat of skin, a hard or full pulse, deep-seated pain in the chest, crepitant rhonchus and bronchial respiration, present, the disease should be viewed as inflammatory, the hæmorrhage being merely a contingent symptom or complication. Even when the hæmoptysis has originated in tubercles, inflammation of one or more lobes of the lungs may also exist, and may implicate not only the substance of the organ,

but also its pleura, giving rise to albuminous exudation, and adhesions to the costal pleura. I have not infrequently found, upon dissection of cases of hæmoptysis, not only tubercles in every stage of their progress and results, but also inflammations of the substance of the lungs, and of the pleura*, with all the structural consequences, and yet, in some cases, no pain had been felt so severe as would have directed attention to an affection of the pleura.

117. *b.* It is not unusual to see hæmoptysis in the course of severe *hooping cough*, especially when this latter disease affects persons near, or after, the period of puberty. In children the hæmoptysis is generally slight; but in grown-up persons it is often a dangerous or fatal complication of hooping cough. — *b.* It is occasionally observed as a consequence of *enlargement* or *congestions* of the *liver* and *spleen*; these affections in some measure causing the pulmonary hæmorrhage, by deranging the circulation through the lungs, or heart, or both. In most of such cases the functions of the heart are intermediately disturbed. Where the hæmoptysis is consequent upon hæmorrhoids, obstructions of the liver may be anticipated. This connection has been noticed by BAILLOU, MORGAGNI, STOLL, LANDRÉ BEAUVAIS, and others. SAUVAGES makes very particular mention of the occasional dependence of hæmoptysis upon enlargements of the spleen. The connection between hæmoptysis and hæmorrhoidal affections is generally one of sequence rather than of association; the former following the latter, or sometimes occurring after operations for these, and for *fistula in ano*. The connection with *amenorrhœa* is generally that of cause and effect; but the pulmonary disease and the attendant hæmorrhage more frequently give rise to the suppression of the catamenia than this latter occasions the hæmoptysis. — *c.* Pulmonary hæmorrhage has also, in rare cases, appeared in gouty persons, or in connection with irregular or misplaced *gout*. In these, calcareous concretions have sometimes been expectorated with the blood, or have been found in the lungs on dissection. — *d.* The symptomatic occurrence of hæmoptysis in the course of *measles*, of *putro-dynamic fevers*, of *scurvy*, *purpura*, and pestilential diseases, requires no remark.

118. *iii.* DIAGNOSIS. — It will often be difficult to determine whether or not the blood discharged

proceeds from the bronchi, or from the nares, throat, pharynx, or stomach, owing to the circumstances insisted upon in other parts of this article (§ 91.99.). The remarks there made, in illustration of this, render it unnecessary to enter much further into the subject. — *a.* When the blood is florid, frothy, or contains bubbles of air, or is mixed with muco-puriform matters, then all doubt will be removed. The history of the case, and the premonitory and attendant phenomena, are generally such as to remove all difficulty, unless when the patient has been previously in good health, or when the blood is of a dark hue, or when a large portion of it has been swallowed, and is thrown up by vomiting. In these cases, it will very commonly be found upon auscultation that blood is present, either in the large bronchi, causing a bubbling rattle, or in the small ramifications, with loss of the respiratory sounds, and with dulness on percussion. Phthisical indications, also, referrible to the constitution, have generally preceded the attack; and symptoms of disorder of the respiratory organs have ushered it in, and accompanied it.

119. *b.* When the accumulation of blood in the *pharynx* from the fauces or adjoining parts excites cough, or escapes into the trachea or bronchi, the difficulty of determining with precision the source of the discharge is generally great. In these the practitioner will be guided chiefly by the state of the patient just before the attack, and by the premonitory symptoms. The absence of disease within the chest, as indicated by auscultation and percussion, an attentive examination of the mouth and throat, and a close observation of the phenomena attending the discharge of blood, will greatly assist the diagnosis (§ 91.99.).*

120. *iv.* PROGNOSIS. — Hæmoptysis is always a serious disease, and attended by danger in most circumstances. This character, however, does not so much depend upon the hæmorrhage, as upon the pathological state or lesion, of which it is the consequence. The opinion as to the result will, therefore, be chiefly formed from the inference as to its source. Wherever there is any obvious sign of tubercular disease, and when dyspnœa or pulmonary symptoms have preceded the attack, a most unfavourable prognosis should be given. The question merely relates to the period which may elapse from the occurrence of hæmorrhage to a fatal termination; and this will depend much upon the season, upon the progress of the pulmonary lesions, and various other circumstances. — The cause of the disease should also be taken into consideration, and the pathological states which complicate the hæmorrhage. When there is reason to infer that venereal excesses, and more especially solitary venereal vices, have induced the malady, as they very frequently do, we may infer that tubercles have preceded the attack; and should consequently form a most unfavourable prognosis, especially when the diathesis is obviously scrofulous or hæmorrhagic. The circum-

* As the article was going through the press, a boy, aged 15, of a scrofulous diathesis, who had been long under my care with tubercular phthisis, died with profuse hæmorrhage from the lungs. Excavations in this organ, with accretion of the pleura, had been recognised some months before his death. He had not complained of pain in any part of the thorax. The body was examined in my presence by Mr. HERBERT BARKER, twelve hours after death. Numerous cavities with thick linings were found dispersed through both lungs; the small intervening spaces being studded by crude tubercles. Each lung contained between thirty and forty ulcerated cavities, varying from the size of a bean to that of a large orange; those on the right side being the largest, and from this side the hæmorrhage had taken place. The cavities on the left side were filled by pus of various colour and consistence. Those on the right were filled chiefly by coagulated and fluid blood, the latter mixed with pus in some places. The right pulmonary pleura was so firmly adherent to the costal and diaphragmatic pleuræ, that this lung could not be removed from the chest until all the costal pleura was removed from the parietes to which it was attached. In this case the heart participated, in its unusual atrophy, in the extreme emaciation of the body. The stomach, as in many cases of profuse or fatal hæmorrhage from the lungs, contained a large quantity of blood, thus illustrating the statements made above.

* PAULUS ÆGINETA remarks, that if the blood be frothy and light, it comes from the trachea; but if it be black or grumous, and if there is pain in the part, it is from the thorax. If it is brought up by hawking, it is from the palate or parts about the pharynx. If it flow from the head, it is evacuated with tickling and cough, for it runs down into the windpipe, and is again brought up; such discharges being generally preceded by an acrid defluxion, and by headach or heaviness. (l. iii. ch. 31.)

stance of the patient not being alarmed by the attack, but flattering himself with the hopes of recovery, should be taken into account, as recommended as early as ARETEUS. The dependence of the effusion upon disease of the heart, especially upon narrowing of the left auriculo-ventricular opening, is, perhaps, not a much more favourable circumstance than the connection with tubercles.

121. A more favourable, but still a guarded, opinion may be given, when the attack seems dependent upon inflammatory determination to the lungs, or on active congestion, or upon general plethora, when the indications of pulmonary disease, or of constitutional fault, are not present; and when the attack has been produced by external violence, or by mechanical injury. If it have arisen from suppressed catamenia or hæmorrhoids, or in connection with congestion or enlargement of the liver or spleen, a similar opinion may be formed, unless the indications of pulmonary disease are manifest; but when the disappearance of these or of other evacuations are evidently the consequence of the disease in the lungs, and of which the hæmoptysis is merely a part, the prognosis should be as unfavourable as in the circumstance above noticed. When hæmoptysis appears after the operation for fistula, particularly when the fistula has been connected with pulmonary symptoms, as it often is, the result may be surely predicted.

122. In every case of hæmoptysis, the opinion should partly depend upon the symptoms immediately preceding the seizure, and upon the frequency and state of the pulse both during and after the discharge; due allowance being made for the alarm caused by the occurrence. If the pulse becomes quick and sharp, the breathing short or oppressed; if symptoms or signs of inflammatory action in the lungs or pleura exist or supervene; if a large portion of the lung cease to be traversed by the air; if the expectoration be puriform, or rusty, or offensive; and especially if a cavity be detected in the lungs, and particles of softened tubercular matter appear in the expectoration, a fatal result should be expected.

123. V. TREATMENT.—A. ARETEUS and PAULUS ÆGINETA recommend that the patient be laid upon a couch in a cool place, with the head elevated; and all physical and mental excitement, and talking, or strong respiration, should always be carefully avoided. As to the means of cure, CELSUS, GALEN, AËTIUS, and ALEXANDER are tolerably agreed. ARETEUS, ORIBASIIUS, ACTUARIUS, and NONNUS, advise bloodletting in most cases, ligatures on the extremities, and astringents internally and externally. A similar practice is advocated by CELSUS, with the addition of cold drinks. SCRIBONIUS LARGUS and OCTAVIUS HORATIANUS direct the chest to be sponged with vinegar. GALEN remarks, that cooling astringents often have a different effect from that which they are intended to produce; that they occasion determination of blood internally, and congestion of the deep-seated veins; and that he has seen persons with hæmoptysis injured by the application of cold to the chest. He, therefore, does not approve of the indiscriminate recourse to astringents and to cold. CÆLIUS AURELIANUS recommends the application of cold water and vinegar, or other astringents, to the thorax, and bleeding, general or local, or both, if pain, dyspnœa, or a

dry cough be present. He gives, internally, gum with alum, and decoction of poppies, vinegar, and electuaries with opium, frankincense, &c. He decides in favour of the disputed practice of applying ligatures to the extremities. Similar remedies are advised by PAULUS, with the addition of austere wine and fruits. Amongst the latter, the pomegranate is particularly mentioned. MARCELLUS directs nearly the same means, with the exception of ligatures. DIOSCORIDES, PLINY, GALEN, ALEXANDER, PAULUS, and most of the ancients prescribe the hæmatite, or blood stone, which contains oxide of iron.

124. The Arabian writers supply very little information respecting the treatment of hæmoptysis, beyond what is contained in the works of the Greeks. AVICENNA, who is very full upon the subject, approves of the internal exhibition of vinegar, and of anodynes, as mandragora, henbane, and poppy, for the relief of cough. AVERROES condemns the use of vinegar; but RHASES and SERAPION advise the chest to be sponged with it. MESUE prescribes chalybeate waters for drink, and astringents. HALY-ABBAS endeavours to adapt the treatment to the forms of the disease. In the hot (the active) variety, he directs bleeding from a vein, and the repetition of it, if required, purging with mild medicines, and the combination of demulcents with poppy. When the disease arises from a cold cause (passive), he prohibits venesection and prescribes stimulants—as frankincense and myrrh, and, in some cases, tonic astringents—as galls, sumach, alum, &c., with astringents applied to the chest. ALSAHARAVIUS approves of bleeding, cold applications to the thorax, opiates and astringents, with a milk diet. RHASES agrees with this practice, but guards against the indiscriminate application of cold to the breast. Mr. ADAMS, in his interesting remarks (*Trans. of PAULUS ÆGINETA*, p. 412.), states that cold applications to this part are not now generally resorted to; yet a practitioner lately acquired great celebrity for curing hæmoptysis by sponging the chest with vinegar. I have been called to two or three cases, for which cold epithems had been most assiduously employed; but they were injurious, and evidently increased the pulmonary congestion and all the pectoral symptoms. VAN SWIETEN is favourable to the internal and external use of cold water in this disease; but I am confident that sponging with vinegar will be found more serviceable and more generally appropriate than a prolonged application of cold.

125. B. From the brief view now exhibited, it will be seen that but little progress has been made in modern times in the treatment of hæmoptysis; and that this progress has reference chiefly to the more appropriate use of the means, which were known to the ancients as well as to the moderns. Much, however, will depend upon the decision with which they are prescribed and carried into effect. Upon seeing a patient attacked by hæmoptysis, the physician will frequently find him alarmed; and the consequences of such alarm may be mistaken for the state of the constitution, or the effects produced by the disease. This and various other circumstances must be taken into consideration, and a determination as to the measures to be adopted, in order to arrest the hæmorrhage, promptly formed.

126. a. The clothes should be removed or loosened

from the upper part of the body, and the patient ought to be seated upright in a chair, in order to facilitate the discharge of the blood from the lungs. In a recumbent, or even reclining posture, the blood will more readily pass along the bronchi, and fill the smaller ramifications, than when the chest is erect, and its movements during respiration unimpeded. If the patient be robust or young, if he have not suffered long from pulmonary disease, and if the hæmorrhage has not been very great, *bloodletting* ought to be immediately performed in the arm from a large orifice, until an impression is made upon the pulse, or faintness ensue. Whilst the blood is flowing, the bared chest may be sprinkled with cold water, or sponged with vinegar; and any astringent the earliest procured, as vinegar slightly diluted, may be taken internally.—The quantity of blood to be abstracted, and the repetition of the operation, must entirely depend upon the effects produced by it, and the judgment of the practitioner; but he will be guided in this by the constitution and state of the patient, by the indications of active congestion, or inflammatory determination, by the continuance and violence of the hæmorrhage, by the antecedent symptoms, and by the information he may obtain as to the causes and pathological relations of the seizure. If the patient be delicate, or enfeebled by previous disease, or if the hæmorrhage has continued so long as to render venesection a hazardous measure, or if bloodletting has been already resorted to, or repeated, *cupping* should be substituted. Where further abstraction of blood, even by cupping, cannot be ventured on, *dry-cupping*, as advised by HIPPOCRATES and most of the ancients, and in modern times by HORNE and WEIDEMANN, ought to be adopted. When the least delay may increase the danger, it may be very efficiently and promptly performed with some common beer glasses, or other similar means, several being applied, either between the shoulders or upon the breast. I have often used dry-cupping, in addition to venesection, with marked advantage; sometimes covering the back and shoulders by the substitutes just mentioned. If the hæmorrhage be connected with suppression of the catamenia or hæmorrhoids, the feet should be plunged in warm water, and a vein opened in each foot. If the hæmoptysis is moderate, a number of leeches may be applied to the tops of the thighs, or around the anus. The derivation produced by these means, and the effects of the latter in restoring the suppressed discharge, should not be neglected. CELSUS advises cupping to be performed in these situations, especially when the disease is thus associated.

127. *b.* It often happens, when hæmoptysis ceases, after a small or a single bloodletting, or when the pulse rises in strength and frequency, that the hæmorrhage returns in one, two, or three days, or after a longer interval. This mostly occurs in young or plethoric persons, where the discharge is connected with congestion of the lungs, or when the first attack has been slight, and the venesection sufficient merely to give a greater freedom of vascular action, without removing the pulmonary congestion or determination. In these cases, bloodletting should be repeated, in order to prevent a renewed attack, especially if the pulse rise after the first depletion, and if signs of inflammatory

action in the lungs or bronchi appear. The patient should be carefully watched after the first discharge, and daily examined by the stethoscope and by percussion; and, upon the first indication of returning hæmorrhage, or of supervening inflammation, blood ought to be taken away in one or other of the modes just stated, according to the peculiarities of the case.

128. Where the antecedent disease, the quantity of blood discharged or removed by venesection, and the manifest asthenia from these or other causes, forbid further depletion, recourse must be had to *derivatives*, *astringents*, and *sedatives*, generally simultaneously or in combination. Indeed, even in those cases which evince increased action, and require decided or repeated depletion, these, as well as refrigerants, ought to be brought as early as possible into simultaneous or successive action. The feet and hands ought to be plunged in warm water; and, if venesection be not performed in the former situation, mustard or salt, or both, should be added to the water. An enema with an ounce, or an ounce and a half, of spirits of turpentine, should be administered forthwith; and other means appropriate to the case prescribed. But as to these means, much difference of opinion will necessarily exist. The internal use of astringents is generally adopted; but those usually employed can have little effect, excepting in slight or protracted cases; and even powerful astringents taken into the stomach will have little or no influence upon the bleeding part before a number of hours have elapsed. From observing the rapidity with which oil of turpentine is absorbed, and passes off by the kidneys and lungs, I have been induced to employ this medicine in preference to others as an astringent in hæmoptysis; prescribing it in small or large doses, according to circumstances, and as it seemed desirable to act at the same time more or less decidedly upon the bowels or kidneys.

129. In advising sponging with vinegar and rose-water, or sprinkling cold water on the breast, I had especial reference to the sympathetic influence these may have upon the bleeding surface, and the reaction in the skin which they subsequently occasion, especially when they are also applied to the face. When these means have not succeeded, I have, on several occasions, prescribed rubefacients, instead of cold applications, to the chest; as these last are more frequently injurious than beneficial in such cases. An epithem, with oil of turpentine, either tepid or warm, allowed to remain on the breast, or between the shoulders, until it occasions a burning sensation and redness, is the rubefacient I have preferred, as the quickest in its operation, and the most conducive to the removal of congestion or of inflammatory action. The vapour also of the turpentine is diffused around the patient, and being inhaled during inspiration, assists in constringing the vessels of the bleeding surface. Where there appears any objection to this application, a *sinapism*, or a piece of flannel soaked with either of the *liniments* (F. 296. 311.), may be placed upon the chest. *Blisters* may also be resorted to. I agree with LENTIN, RANOË, and PERCIVAL, in the propriety of applying them to the back or between the shoulders.

130. *c.* Besides the above means, others may be employed; the practitioner being guided in his selection by the peculiarities of the case, and es-

pecially by the previous treatment, by the state of vital power and vascular action, and by the presence of cough and febrile symptoms. It should be kept in mind, that the sooner the hæmorrhage is arrested, the least likely is infiltration of the bronchi and its consequent evils to take place; and that, whilst this — *the first indication of treatment* — is receiving attention, the accumulation of the effused blood, and the consecutive effects upon the bronchi and lungs, and through them upon the system, ought to be prevented as far as possible. — The treatment already described, with reference to hæmorrhage in general, is, in great measure, appropriate to hæmoptysis, according to the principles of its application already advocated. Most of the information that will be here conveyed may be viewed chiefly as suggestions, which the practitioner will receive or reject, as he may deem proper, or which he may apply to practice as the features of the disease may warrant. He ought, however, to be impressed by the fact that, however high vascular excitement may appear, vital tone is more or less impaired; that in proportion as tone becomes diminished, so will the tendency to infiltration of the bronchi or lungs with the effused blood, and to capillary congestion of them, be increased; and, consequently, that vascular depletions and other vital deprivements, although often requiring promptitude and decision, should be employed with discrimination and caution.

131. *d.* Of the various *astringents* recommended in hæmoptysis, the *acetate of lead*, conjoined with opiates or other sedatives, as advised by REYNOLDS, LATHAM, DAVIES, VALENTIN, AMELUNG, and others, is one of the most deserving of adoption. It may be given more freely than has generally been done, as shown by Dr. A. T. THOMSON, if it be conjoined with acetic acid, this acid being itself one of the best remedies when taken in sufficiently large quantity. Of this the ancients were fully aware, as it was employed most liberally by them. The *mineral acids* appear to be preferred by HENNING, DOEMLING, HALLER, JOERDENS, LOEFLE, SCHULZE, and others; and by most of the moderns. I have, however, seen the liberal use of common vinegar more efficacious than these; and it is more generally congruous with the other remedies usually employed. Indeed, where the acetate of lead is given, the mineral acids will either neutralise its effects or prove injurious. The *gallic acid*, dissolved in water, or in ether, or in alcohol; and the powder or tincture of galls may be mentioned. RUSPIN's styptic is supposed to be a solution of this acid in ether or in spirit; and may also be tried, on account of its reputed efficacy.* Of other astringents, little additional mention need be made. They are sometimes useful in the more adynamic states of the disease, or after large losses of blood, or copious depletions. When debility is urgent, those which are most tonic may be selected, as the tincture of the muriate of iron; the sulphates of iron, or of alumina, or of zinc, or of quinine — the two latter in the infusion of roses with sulphuric acid; and the vegetable astringents, as catechu, kino, uva-ursi, extract of logwood,

rhatany, pomegranate bark, &c. The mineral acids, as well as the other astringents, may be conjoined with opium or other anodynes. — A strong solution of alum, and alum whey, for common drink, have been very generally employed by both ancients and moderns.

132. *e.* *Refrigerants* are required in the more febrile and active states of the disease, as adjuvants, chiefly of depletions, and other antiphlogistic remedies. They are further beneficial by acting upon the kidneys. *Nitre*, in considerable or frequently repeated doses, is recommended by GIBBON, DICKSON, HARTMANN, HUFELAND, and many others. It is much used by the Italian physicians, in large doses, conjoined with demulcents. They give from three to six drachms in twenty hours. It is also beneficially associated with camphor, the acetate of ammonia, and sweet spirits of nitre (F. 95. 294. 747.), or with the *boracic acid* (F. 644.), and with conserve of roses. The *muriate of ammonia* is equally serviceable, especially in the more passive states of hæmoptysis, when it is advantageously conjoined with muriatic acid (F. 864.). LENTIN advises it to be taken in half a drachm every two hours, with an equal part of extract of liquorice. The internal use of ices, or of iced fluids, has been advocated by many writers. But, like all other active means, they require discrimination. In the passive states of the disease — where asthenia is apparent, the circulation languid, and the temperature not much above the natural standard, — they are injurious.

133. *f.* Alvine evacuations are serviceable, by removing morbid matters and obstructions to the portal circulation, and by deriving from the seat of hæmorrhage. — *Purgatives* ought, therefore, never to be neglected; and, unless when the hæmoptysis is so abundant as to be alarming, they should precede, or be alternated with, astringents; or such of these latter as will not confine the bowels ought to be selected. The exhibition of an *emetic*, previous to the purgative, has been advised, especially by STOLL, DARWIN, PLENCIZ, RANOE, DOEMLING, PAULINI, and SCHMIDTMANN; whilst FRANK and some others think them hazardous. When the hæmorrhage has been already copious, or after bloodletting has been resorted to, an emetic of ipecacuanha, or of sulphate of zinc, or of a combination of both, is serviceable, not only in aiding the arrest of the effusion, but also in evacuating the blood accumulated in the bronchi, and thereby preventing the ill effects which this fluid would produce if it were allowed to remain. It is not merely the vomiting caused by an emetic which is beneficial, but the effect which is produced upon the heart's action. It is with reference chiefly to this latter operation — to its contra-stimulant action — that emetics and *nauseants* have been recently employed on the Continent, especially in Italy, and by LAENNEC and others in France. In the passive or asthenic forms of the disease, nauseants, especially the tartar emetic, may be injurious — even in the same case, wherein an emetic of sulphate of zinc might prove of service. As to *purgatives*, the neutral salts, with an excess of acids, as the sulphates with sulphuric acid in infusion of roses, or the supertartrate of potash, in the form of electuary, are the most generally appropriate — with the exception, perhaps, of oil of

* Dr. A. T. THOMSON states that this styptic consists of gallic acid, a small proportion of the sulphate of zinc, and of opium, dissolved in a mixture of alcohol and rose-water. This combination is judicious in most hæmor-

turpentine, conjoined with castor oil.—These oils may be taken on the surface of an aromatic water or of milk, and be administered in enemata.

134. *g.* In exhibiting *anodynes*, the probability of their being injurious in the asthenic states of hæmoptysis should be recollected. When the powers of the system are inadequate to procure the excretion of the fluid effused into the bronchi, they ought to be given with caution, or in conjunction with tonic astringents, or with expectorants. *Colchicum* has been recently recommended, but it is only in the active states of the disease that it ought to be exhibited (F. 545.). *Digitalis*, however, is more generally prescribed. It is recommended by WITHERING, JONES, FERRIAR, HEUSINGER, VALENTIN, CARSON, HENRY, HORN, and others. It may be conjoined with astringents (F. 544.), narcotics, or other appropriate remedies (F. 514, 515.). —*Narcotics* are most serviceable when cough is urgent — by allaying the irritation, and diminishing the risk of the perpetuation or recurrence of the effusion from this cause. But when the hæmorrhage has ceased, and when breathing is difficult, the lungs congested, or the bronchi obstructed, by the effused blood, narcotics, especially in large doses, will only retard the discharge of the effused blood, and increase the mischief, unless they be conjoined with expectorants, as the senega, or benzoïn, benzoic acid, myrrh, assafoetida, the balsams of Peru or of Tolu, the terebinthines, or camphor. In the passive states of the disease, or after large losses of blood, the balsams, both natural and artificial, especially those prescribed in the *Appendix* (F. 18—22.), are often beneficial. The balsam of LOCATELLI is very much employed in the Continent in hæmoptysis, and, from its composition, it seems very appropriate to most circumstances of the disease. The turpentine is the active ingredient, not only of it, but of the other artificial balsams prescribed in hæmorrhagic affections. The following is the usual mode of preparing it:—

No. 241. R Olei Olivæ ʒ viij.; Terebinthinæ, Cera flavæ, aa ʒ iv.; Pulv. subtiliss. Ligni Santali rubri ʒ ss. Ceram in Olei pauxillo solve, dein reliquum, Terebinthinam, Lignumque Santali adde, et assidue move donec refrigerunt.

135. *h.* There have been various other means recommended for the arrest of hæmoptysis, but many of them are not deserving of notice, and are therefore not here adverted to. The application of *ligatures* on the extremities was a disputed practice with the ancients, although most of them recommended them. J. P. FRANK and J. FRANK approve of them, and direct them to be placed high above the knees and elbows in such cases as admit not of bloodletting, owing either to the profuse hæmorrhage, or to constitutional adynamia. *Ipecacuanha* in small doses frequently repeated is praised by LOEFLE, HENNINGS, AASKOW, KECK, and NIEMANN; and by DE MEZA and HORN, conjoined with opium; the *secale cornutum*, by SPAZANI, NEGRI, and RYAN; a strong solution of *common salt*, by PERCIVAL, DOEMLING, MICHAELIS, and RUSH; the turpentine, by YOUNG, BOYLE, and ADAIR; and the *comfrey*, with aromatic sulphuric acid, by WENDT. With MARRYAT and numerous practitioners, mixtures containing nitre or alum, gums, and some one of the balsams, constituted the principal anti-hæmorrhagic remedies; and vascular depletions were prescribed. It cannot be doubted that

bloodletting is often unnecessarily directed in hæmoptysis, or carried too far; but in the active or inflammatory states of the disease, and when the discharge is scanty or small, it should not be neglected.

136. *i.* A few authors have questioned the propriety of arresting the effusion in certain circumstances. Dr. A. T. THOMSON remarks, that when the hæmoptysis “is not of an alarming character, and there is no obvious predisposition to tubercular consumption, especially if it be the consequence of a suppression of the menstrual discharge, it should only be moderated, not checked suddenly, which might induce a congestion in some organ less capable of supporting it with impunity.” This is most dangerous doctrine; for, if the hæmorrhage be judiciously treated, the sooner it ceases in consequence the better. Hæmoptysis, in the circumstances stated by this writer, ought to be treated by depletions, derivatives, and other measures calculated to restore any suppressed discharge. The cases are very few in which there is no “obvious predisposition to tubercular consumption,” and they are still fewer in which the suppressed discharge is the cause of the pulmonary disease; this latter, in either its more concealed or obvious states, almost always preceding, and even being the chief cause of, the suppression. It should be kept in view, that however moderate the hæmorrhage may appear to be, it is difficult to determine how far it may be attended by infiltration of the bronchi; and that the continuance of it, by filling these vessels, will risk the supervention of inflammatory irritation or action in them, and often also in the substance of the lungs and pleura; as well as hasten the development and progress of the tubercular productions.

137. *k.* The practitioner is not to rest satisfied with having fulfilled the first intention—the arrest of the hæmoptysis—his attention should immediately afterwards be directed to the removal of any blood that may have collected in the bronchi, and of whatever inflammatory irritation connected with it either coetaneously or consecutively, that may exist. Where a crepitation is present, and is much diffused through the lung of one or both sides, more generally of one, fluid is present, and it is either a mucous lymph, or blood, or both, with more or less serum; the state of the expectoration indicating the proportions of either. But the blood may not be expectorated, or may undergo changes previous to expectoration, and clog up the bronchi and air-cells, and either perpetuate inflammatory action, or excite it anew. In the slight forms of hæmoptysis attendant upon tubercles, the effusion of blood is frequently one of the consequences of the inflammatory irritation existing in various parts of the bronchi, connected with impaired tone and congestion of parts of the substance of the lungs. Now, by what means is the above consecutive condition to be removed? When the attack has been treated actively, the more antiphlogistic means having been employed, and the lungs still remain embarrassed, manifestly from a portion of the effused blood, or from the fluid subsequently exuded, the exhibition of an emetic, and the repetition of it, as circumstances may indicate, will prove most serviceable. If febrile action, heat of skin, &c. be still present, then tartar emetic, ipecacuanha, or both, may

be thus employed; but when the vital powers are sunk, and asthenia is very prominent, the sulphate of zinc should be preferred. In cases characterised by relaxed, thin, or weak fibres, and general flabbiness of the soft solids — where bleeding would be injurious, *emetics* are frequently most beneficial. — They have been often advised in hæmoptysis; but the indiscriminate or inappropriate use of them, and the somewhat empirical recommendation of them by Dr. MARRYAT, have led to their disuse. I have, however, often prescribed them with great benefit. This writer directs two grains of tartarised antimony to be first given, and, as soon as nausea commences, two grains of sulphate of copper, dissolved in a little water. He deprecates blood-letting, and, after the sickness has gone off, gives twenty drops of the balsam of copaiba, night and morning, for several weeks, to prevent a return of the attack, and the size of a nutmeg of the following electuary, twice or thrice a day: —

No. 242. R Pulv. Cinchonæ 3vj.; Sulphuris Sublimati 3iij.; Potassæ Nitratis 3j.; Sulphureti Antimonii Præcipitati ʒj.; Mucilaginis Acaciæ, q. s. ut fiat Electuarium.

138. I have no doubt of this treatment being quite appropriate to many circumstances of the disease; and, even in those cases where inflammatory action may supervene after the hæmorrhage has ceased, it may prove beneficial, especially if local depletion by cupping; external derivation by blisters, sinapisms, terebinthinated epithems or liniments, or by issues or setons; and suitable regimen, be employed. In order to fulfil the intention stated above, as well as to *prevent the return of the hæmorrhage*, the assiduous adoption of these external irritants, the internal use of the balsams or terebinthines (F. 18—22.), and an emetic occasionally, to unload the bronchi of accumulated fluids or mucosities, will prove most serviceable. At the same time, the digestive and excreting functions ought to receive due attention; and cough or irritation should be allayed by the combination of narcotics and sedatives, as conium, hyoscyamus, opium, &c.; and of emollients or demulcents, with the above, or other suitable medicines. When the hæmoptysis assumes a periodic form, which rarely is observed, the combination of the sulphate of quinine with alum or with sulphate of zinc (F. 597. 667.), or the electuary just prescribed, according to MARRYAT, will generally prove successful.

139. *l.* The *inhalation* of watery or medicated vapours has been recommended in hæmoptysis, and lately employed by both rational and empirical practitioners. I have tried several substances, and in various combinations, through this medium. The practice requires much caution; but I think it will be found often of service if discrimination as well as perseverance be observed in respect to it. Towards the decline, or in the slighter forms of hæmoptysis, the more astringent substances may be used in this way, care being taken, that they neither occasion irritation or tightness in the thorax, nor excite cough. Those which I have tried in this state are — common vinegar, sometimes with a little camphor, or with a small quantity of turpentine; the pyroligneous acetic acid, kréosote, and common tar. These were put in an inhaler with hot water, and the vapour inspired in the usual way; or in a large basin, and hot water poured upon them, and

the vapour allowed to diffuse itself around the patient. When a terebinthinated epithem, or liniment (F. 300. 311.) is used, the vapour from it will generally be sufficient. Some time after the hæmorrhage has ceased, the cautious adoption of this practice will be serviceable; and either these or other substances — as benzoin, assafoetida galbanum, myrrh, and other odoriferous resins, oil of aniseed — may be employed in this way, as directed in the article BRONCHI (§ 100.). In the more *asthenic forms* of the disease, when the expectoration is copious, or is tinged with very dark blood, the diffusion of the vapour of the above substances in the air of the patient's apartment, and the taking of frequent deep inspirations, will frequently prove beneficial. If the patient evince indications of coexistent or consecutive *inflammatory action*, *emollient vapours* (see art. BRONCHI, § 76.), with the addition of the extract of conium or of hyoscyamus, or of stramonium, to the warm fluids employed for inhalation, will be extremely useful, especially if cough be severe.

140. *C.* The *regimen* during and after hæmoptysis is a most important part of the treatment. *a.* The ancients advised cooling beverages and diet. They allowed acid wine, and acerb or acid fruits. The *pomegranate* was much and deservedly praised by them, on account of its cooling and astringent operation. Glutinous and mucilaginous articles of diet were also recommended. All these deserve adoption. The principal question is, as to the diet which should be adopted. Dr. STEWART, some years ago, advised nourishing diet, cold sponging the surface, cold bathing, and exercise in the open air, and frequently with advantage. To persons of a relaxed habit, with a slow or natural pulse, and to those not suffering from febrile action, this plan is generally appropriate; very dilute acids, or lemonade, or common vinegar and water, being the usual beverage. He directed the whole surface of the body to be sponged in the morning; and the neck, breast, and shoulders at night, with tepid vinegar and water, gradually reducing the temperature to that of the surrounding air. After the sponging, frictions with flannel or the flesh-brush for half an hour were enjoined. Cold bathing and salt-water bathing were afterwards employed, and continued until recovery took place. Dr. STEWART advised this method in both febrile and non-febrile — in acute and chronic cases. In the non-febrile and chronic it is often serviceable, and, early in the febrile, it may also be occasionally useful. Sponging the surface, and assiduous friction immediately afterwards, are applicable to most cases; but the diet requires greater discrimination. Where fever is present, animal food increases the patient's ailments. In those, farinaceous glutinous, or mucilaginous substances only should be allowed, with goat's whey, stale butter-milk, grapes, raisins, the fruit of the carob or St. John's bean, asses' milk with Seltzer-water, &c.

141. *b.* The propriety of having recourse to repeated small depletions, or to a moderate blood-letting, about each equinox, in order to prevent the recurrence of hæmoptysis, has been insisted on by some writers, and when the effusion depends chiefly upon plethora or active determination to the lungs, the practice may be of service;

but when it occurs in the progress of tubercular phthisis, it may be injurious if indiscriminately adopted, although it may be of use in those cases in which subacute inflammatory action, or congestion of portions of the lungs, often complicate the tubercular formations, and occasion the sanguineous discharge. In the more asthenic states, depletions favour the progress of the tubercles, and are more or less injurious. The regulation of the excretions; the restoration of suppressed evacuations or accustomed secretions; occasional change of air; residence in a mild, humid, and equable climate; sea-voyaging; gentle exercise in the open air; flannel clothing next the skin; cold sponging the surface; acidulated drinks; light and nourishing food; mental quietude; and the avoidance of whatever depresses the vital powers, are severally productive of benefit: some of them ought not to be dispensed with. Exertions of the voice, playing on wind instruments, venereal indulgences, warm baths, and exposure to vicissitudes of the weather and season, ought always to be shunned. (See art. TUBERCULAR CONSUMPTION.)

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VI. HÆMORRHAGE FROM THE STOMACH.

SYN.—*Hæmatemesi* (from αἷμα, gen. -ατος, blood; and ἐμεσις, vomiting), Linnæus, Sagar, Vogel, Sauvages, Pinel, Good. *Vomit* *cruentus*, vel vom. sanguis, vomitio sanguinis, Auct. Lat. var. *Hæmorrhæa ventriculi*, Swediaur. *Gastrorrhagia*; *Æsophagorrhagia*; *Morbus niger*; *Fluxus splenicus*, Auct. *Vomissement de Sang*, *Hématémèse*, Fr. *Blutbrechen*, Germ. *Vomito di Sangue*, *Ematemesi*, Ital. *Vomiting of Blood*.

142. DEFIN.—*A vomiting of a dark-red, black, fluid, or a semi-coagulated blood, sometimes pure, at*

other times mixed with a ropy or watery fluid, or other matters contained in the stomach; preceded by nausea, oppression, tension or heat of the epigastrium, sometimes by faintness; unattended by cough; and frequently accompanied with very dark-coloured, grumous, or pitchy stools.

143. i. PATHOLOGY.—Like dropsy—of which it may be either an antecedent or epi-phenomenon—vomiting of blood is seldom an idiopathic or primary disease, but generally the consequence of certain pre-existing changes, sometimes chiefly seated in the stomach, at other times in the collations viscera, as the spleen, liver, or pancreas, and occasionally in some two or more of these organs. The blood may proceed from the mucous surface of the stomach, which is most commonly the case; and from the surface of the duodenum, or of the œsophagus. It is generally poured out from the congested, dilated, and weakened capillaries and exhaling pores of this surface; but it may be effused either from a limited part, or from a few small vessels chiefly, as when it depends on a congested or other morbid state of the spleen, or on ulceration, or from one or more diseased or ulcerated vessels, which latter is but rarely the case. It may proceed, also, from the rupture of an aneurismal tumour which has poured its blood either directly or mediately into the stomach; or, as supposed by some to happen in a very few instances, it may even flow along the ducts from the liver into the duodenum, from whence it may be partly regurgitated into the stomach; but this is extremely doubtful. The blood may, however, as shown above, pass from the posterior nares, or throat, or from the respiratory organs, into the stomach, and be afterwards vomited; and thus hæmatemesis may be closely simulated.

144. Besides these sources of the hæmorrhage, it is of importance to recognise the general condition of vital energy of the system accompanying it, as well as the state of action which the heart and arteries may evince. Hæmatemesis is attended with almost every grade of vascular action, from the lowest state of sub-action, to the most acute action; but more frequently the vascular system is deficient of vital tone, and this condition is extended, more or less, to all the soft solids of the frame. In a very great number of cases of this disease, also, we observe a state either of general cachexia, or of congestion, morbid function, or morbid structure, of more than one of the abdominal viscera.

145. Hæmatemesis is, more commonly than is generally stated by authors, a mode of termination, or a consequence, of inflammation, or of inflammatory irritation and congestion of the internal tunics of the stomach and duodenum, particularly when it presents signs of sthenic action, or is preceded by cardialgia, acute pain, tenderness, distension, and a sense of heat in the region of this organ, or when it occurs in young, plethoric subjects, and is caused by ingurgitation, by acrid matters received into the stomach, by the use of inebriating fluids, and by the suppression of accustomed discharges. In this *inflammatory form* of the disease, the blood thrown from the stomach is seldom in large quantity at one time, although frequently ejected, and is of less deep colour than in some other varieties; and that taken by venesection is usually cupped and buffed. I agree,

however, with QUARIN, RICHTER, FRANK, and SCHMIDTMANN, that this disease is more frequently accompanied with an asthenic, than sthenic, state of the vital powers.

146. It is of the utmost importance to appreciate justly the foregoing states, as upon them are chiefly based our opinions respecting the exact nature of the disease, and the most successful mode of removing it. In the following observations I shall notice—*first*, the primary and less complicated state of hæmatemesis; *secondly*, the supplemental, succedaneous, or vicarious forms of this disease; *thirdly*, hæmatemesis from disease of the viscera connected with the stomach; *fourthly*, hæmorrhage from certain organic lesions of the stomach, or of its vessels, and from complications with other diseases; and, *lastly*, that rarer form of hæmatemesis, which, from the colour of the ejected fluid, has been called the *morbus niger*.

147. A. *Primary or Simple Hæmatemesis*.—This form of the disease is entirely dependent upon the state of the mucous surface of the stomach, or upper portion of the duodenum. It may arise from a constitutional tendency to hæmorrhage, heightened in this particular part of the digestive mucous surface by some of the exciting causes of the disease, especially by an excessive use of vinous or spirituous liquors, or by both, and by general vascular plethora. It seems to be preceded by, and even to consist in, a more or less congested, weakened, or atonic state of the extreme venous capillaries arising in this surface, connected with similar states of this surface itself (see art. DIGESTIVE CANAL). But, conjoined with these states, there may exist increased action of the vessels supplying the bleeding surface. When it proceeds chiefly from the former of the conditions now referred to, there are generally appearances of deficient tone throughout the soft solids of the body. The blood ejected is dark-coloured, or grumous; and although there may be pain or tenderness of the epigastrium, there is no sense of heat, or sign of increased or sthenic vascular action.

148. When it depends more upon local determination, or increased action, arising from an irregular distribution of the vital energies with which the vascular system, or particular viscera, is endowed; or when it is consequent upon the state of inflammatory congestion referred to above (§ 145.), the vomiting of blood is either preceded by, or accompanied with, a frequent, soft, open, and sometimes small, pulse, by a sense of pain or tenderness, and of heat, at the epigastrium, with other symptoms of gastritis; and the blood thrown up is redder and more fluid than in the foregoing case, and seldom in very large quantity; but is sometimes mixed with portions of lymph, or with substances of a fleshy or fibrinous appearance. This particular state of the disease is often connected with a plethoric state of the vascular system, particularly of that part forming the portal system. When this obtains, the history of the case, the preceding causes, and circumstances connected with it, will assist us in forming a diagnosis. The patient generally is of a full habit of body, or he presents appearances of vascular plethora. The pulse is full, broad, and strong, and there is often fulness of the abdomen, particularly towards the epigastrium and hypo-

chondria, but without that degree of fulness, tumefaction, pain, or tenderness in the hypochondria, which attends upon serious disease of the spleen or liver, and which accompanies the third variety (§ 151.). This form of hæmatemesis in delicate constitutions, or in those predisposed to hæmorrhagic disease, occasionally follows upon acrid or irritating substances taken into the stomach. Thus it has been produced by the irritation of an emetic, and by acrid poisons. WARTON, GLISSON, and HOFFMANN, have observed it occasioned by the use of irritating emmenagogues. It may assume a chronic, remittent, or periodic character. In two instances, in which it was occasioned by the daily excessive use of intoxicating liquors, it recurred every morning for several weeks; and, in one of them, was followed by a most violent attack of gout.

149. *B. Succedaneous or Vicarious Hæmatemesis.* — This form of the disease is not of infrequent occurrence. It is noticed by several authors, and particularly by BALLONIUS, HOFFMANN, FORESTUS, WHYTT, RIEDLIN, THOMANN, PINEL, and others, and has come before every experienced practitioner oftener than once. It generally arises from those causes which suppress suddenly, or prevent the return of, the *menstrual discharge*, or the *hæmorrhoidal flux*. It may even replace an habitual *epistaxis*, or occur in females in the form of misplaced catamenia, this part of the uterine functions not having appeared. In the majority, however, of such cases, the hæmatemesis has been occasioned by some evident cause, and in its subsequent occurrence, it has assumed a periodic or vicarious form. This form may even manifest itself from the commencement, as where it has occurred instead of the catamenial evacuation, which has either not appeared, or been but imperfectly established.

150. From whatever cause this state of the disease may proceed, it evidently arrests or prevents the discharge the place of which it supplies; and, although it cannot be generally shown to depend upon previously existing disease of the stomach, or of the viscera intimately connected with this organ, yet we may suppose that the mucous surface and vessels of the stomach have been disposed to experience congestion, local determination, or the morbid conditions on which hæmorrhage has been shown above to depend. Possibly, also, the morbid states of the surrounding viscera may have been such as to assist in producing the hæmorrhage, although these states cannot be generally recognised, owing either to their slight extent, and the obscure or imperfectly developed phenomena attending them, or to our imperfect powers of observation. When hæmatemesis is consequent upon, or vicarious of, hæmorrhoids, particularly in aged or intemperate persons, a morbid state of the liver, as respects either its functions or its structure, as well as of the stomach, may reasonably be inferred, so far at least as to lead to an intimate examination of the state of this organ. Admitting the frequency of this morbid relation, we cannot, however, infer its constant existence, seeing that we often fail in detecting it, and of observing it after the hæmatemesis has ceased. It seems, therefore, more correct to infer that, in cases of this description, the sanguineous effusion is often a consequence of inflammatory congestion of the villous coat of

the stomach and duodenum, which has taken place more suddenly, and induced more rapidly the effusion than in some other forms of the disease.

151. *C. Hæmatemesis from Disease of the Viscera connected with the Stomach.* — The vomiting of blood in this form of the disease is *symptomatic* of congestion or structural change of the spleen, liver, or pancreas, or even of some other abdominal viscus. This is the most frequent form of hæmatemesis. A congested state of the stomach, and even also of the duodenum, being caused by obstructed circulation through, or other disease of, one or more of these viscera, any accidental irritation, or whatever increases the congestion on the internal surface of the stomach, may occasion the effusion of blood from it. Most frequently, perhaps, the hæmorrhage is produced by obstruction, enlargement, or some other lesion of the spleen, the anastomoses of the vessels of this organ with those of the stomach favouring its occurrence. When hæmatemesis arises from disease of the liver or spleen, the history of the case, the presence of fulness or tumefaction, tenderness or pain, in the hypochondria and epigastrium; symptomatic pains about the shoulders or shoulder-blades, an unhealthy or sallow state of the countenance, and chronic functional disorder of the stomach and bowels, will generally be observed. The discharge of blood in this form of hæmatemesis has sometimes acted as a critical evacuation, the symptoms of congestion of the liver or spleen, or of both, which had existed, having been removed by it, and health restored. Instances of this kind have been recorded by DE HAEN, FRANK, PÖRTAL, PINEL, SCHMIDTMANN, and others, and have occurred to myself, particularly in persons who had suffered long from ague. More frequently, however, the hæmorrhage has furnished only a temporary advantage, the disease of the liver or spleen, which it had relieved, again returning, followed by an attack of hæmatemesis and another period of relief; or terminating fatally, dissection disclosing the extent of the disease of which the hæmorrhage was merely a symptom. In this variety, the blood thrown up is generally of a dark colour, and either fluid or grumous, and consisting of small coagula. The stools are also morbid — frequently black, pitchy or grumous, loose, and very offensive. The hæmorrhage is often preceded by, complicated with, or followed by, dropsy of the abdomen, or of the lower extremities, or both; but rarely with hydrothorax, unless it have followed the effusion into the peritoneal cavity. In some instances, obstinate diarrhoea or dysentery has supervened, especially in warm or miasmatic climates.

152. I agree with TRALLÉS (*De usu Opii*, vol. ii. p. 29.), who has strongly insisted on the frequently active or sthenic state of the vessels in hæmatemesis, that, in the preceding forms, the impeded or obstructed return of blood through the veins frequently occasions an augmented action of the arteries; and, as the blood cannot pass in sufficient quantity, or with requisite celerity, by the veins, that it is determined with greater impetus into the extreme arterial capillaries, thereby dilating their exhaling pores, and being effused into the cavity of the organ. Some degree of vascular reaction may also take place

on the villous surface of the stomach from this circumstance, giving rise to the membranous pieces of lymph which are sometimes ejected along with the blood, or subsequently.

153. *D. Hæmatemesis from Disease of the Coats or Vessels of the Stomach, and from other Maladies.*

—The discharge of blood from the stomach may arise from ulceration having extended into one or more vessels; or from disease of the coats of an artery or vein, or from atheromatous or other deposits in the coats favouring their perforation or rupture. Such occurrences are, however, very rare. In a case of extensive and fatal hæmatemesis consequent upon scirrhus of the pylorus, in an aged man, attended by Mr. BYAM and myself, the arteries of the stomach were found studded by atheromatous deposits, and the coats of a considerable arterial branch were at one part destroyed by them, an opening from the interior of the vessel into the stomach having been detected after a minute examination. The effusion may even proceed from perforation and adhesion of the stomach to the liver or spleen, ulceration having extended to these viscera. It may also occur in an advanced stage of scirrhus ulceration of the pylorus or cardia; or from tumours, particularly those of a malignant character, in the parietes of the stomach; but in these cases the hæmorrhage seldom proceeds from the ulcerated part, or from the tumour, unless they be of a fungoid kind, the blood being exuded chiefly from the villous surface of the organ. Hæmatemesis may be also occasioned by any lesion causing hæmorrhage from the internal surface of the œsophagus, or from the bursting of an aneurismal tumour or varix in this situation as well as in the stomach itself. When the effusion takes place from the œsophagus, the blood generally passes in the first instance into the stomach, whence it is ejected with the contents of this viscus by vomiting; but it is sometimes eructated or gulped up without nausea or retching.

154. Blood is occasionally thrown off the stomach in the progress of continued fevers, particularly of those of an adynamic or putro-adynamic form; and of those complicated with predominant disease of the stomach, liver, or spleen. It is also sometimes vomited in long-continued remittent and intermittent fevers, and more rarely in the exanthemata. Hæmatemesis has even ushered in severe attacks of smallpox and scarlet fever; and has sometimes supervened in the course of hooping-cough, particularly in plethoric and cachectic persons, and in those affected with visceral disease. It is not unfrequently symptomatic of scurvy or purpura hæmorrhagica; the blood being exuded from the extreme vessels in consequence of deficient tone and weakened vital cohesion of the villous coat of the stomach, and of the whole digestive canal. In these latter complications, the quantity of blood evacuated by stool is often greater than that thrown off the stomach. Lastly, hæmatemesis sometimes occurs in persons affected by intestinal worms, especially tænia and lumbrici. It is, moreover, occasionally complicated with hysteria and disorder of the uterine functions. It not infrequently alternates with, or is supplemental of, some other hæmorrhage.

155. In the first and second of the foregoing states, constituting the more *idiopathic* varieties

of hæmatemesis, as well as in the third and fourth, forming the *symptomatic* and *complicated* conditions, the appearance of the stools is the next deserving of attention to the quantity and state of the blood thrown off the stomach. In many cases, the quantity of blood passed from the bowels is greater than that vomited. This happens most frequently when the blood is slowly effused, without irritating the stomach. It then passes the pylorus, and undergoes a partial digestion, or mixes with the secretions poured into the alimentary canal; imparting a very dark colour, or pitchy or black grumous appearance, to the stools.

156. *E. Vomiting of Black Matter*—the *morbis niger* of the ancients.—When the blood continues long congested in the capillaries of the stomach previous to its effusion, it gradually acquires a dark colour, and loses the property of coagulating. When, also, the congestion of the venous capillaries has continued long, the arterial ramifications passing into them necessarily participate in this state, the blood in them assuming venous characters. This condition of the circulation of the organ sometimes occurs, especially in persons of a spare habit of body, of a morose, irascible, and melancholic temper; and of a pale, sallow, or jaundiced countenance; and is attended with, or followed by, pain and distension in the epigastrium and left hypochondrium, flatulence of the stomach, debility or sinking, borborygmi or tormina, and several other symptoms usually indicating the approach of hæmatemesis. At length, during great prostration of strength, or deliquium, followed by nausea, and sometimes colicky pains of the abdomen, vomiting of a black tar-like matter takes place, often with similar discharges from the bowels. This matter is occasionally extremely offensive, and is evidently the result of serious changes in the vital action of the vessels of the stomach, liver, and spleen; the tone of the capillaries, and the healthy cohesion of the digestive mucous surface, being lost, and thereby allowing the exudation of the altered blood into the cavity of the organ, this fluid becoming still further changed by admixture with the acid gastric juice and exhalations poured out by the villous surface. It will be seen from this, that I consider the discharge of a black matter from the stomach as a modification or variety of hæmatemesis, occurring in an extremely asthenic state of the frame, and most probably from some degree of perverted function, not only of the stomach, but also of the liver and spleen. It may be also inferred that a morbid state of the secretions from the mucous follicles and liver may co-exist with these changes, and that the admixture of those secretions with the effused blood may deepen the already dark colour of this fluid; but this effect is chiefly produced by the free acid shown by Dr. PROUT to exist in the gastric juices.

157. ii. CAUSES.—*A.* The *predisposing causes* of hæmorrhage from the stomach are,—hereditary conformation and disposition to hæmorrhagic affections; the female sex; the sanguine and irritable temperaments, and the melancholic and the hypochondriacal, especially in persons with a pale, sallow, or earthy appearance of countenance; the full and plethoric habit of body, and irascible disposition; indolent and luxurious modes

of life, particularly when adopted soon after puberty; addiction to the use of spirituous liquors, or of inebriating fluids of any description; indulgence in too much food; the continued influence of moist and miasmatic states of the air; chronic affections and congestions of the abdominal viscera, particularly of the spleen, liver, and pancreas; the advanced months of pregnancy; and irregularity or suppression of the menstrual discharge. J. P. FRANK states that he has met with hæmatemesis most frequently between the thirtieth and and fiftieth years of age.

158. B. The *exciting* and *determining* causes are — blows and injuries on the abdomen, particularly on the hypochondria and epigastrium; violent concussions or succussions of the trunk; external or internal pressure on the stomach; the ingestion of irritating or hurtful matters into this viscus; the intemperate indulgence in food or stimulating liquors; the presence of worms, larvæ, leeches, &c., in the stomach or upper part of the intestines; the irritation occasioned by morbid or excoriating bile on the surface of the duodenum or stomach; powerful or irritating emetics, especially when given in the advanced stages of fevers, or in cachectic or visceral diseases; the suppression of accustomed discharges, particularly the menstrual or hæmorrhoidal; the application of cold, or of cold and moisture, to the lower extremities or surface of the body, during perspiration or the catamenial period; unusual distension of the colon, owing to habitual or continued costiveness; neglect of the bowels, and consequent accumulation of fœcal matters; violent fits of passion; disease of the vessels of the stomach, or collatitious viscera; the gravid uterus, and large tumours developed in any part of the abdomen. Whatever, in short, irritates the mucous surface of the stomach, or interrupts the return of blood from the organ, will occasionally produce the disease.

159.iii. SYMPTOMS.—A. *Premonitory Symptoms*. — The patient generally complains, previous to the accession of the hæmatemesis, of many of the symptoms of hæmorrhagy, as well as of others peculiar to this species. These are commonly, cardialgia; tension or pain at the epigastrium, with either loss or increase of appetite; sometimes faintness, or a sense of sinking or of anxiety at this region; flatulent or acrid eructations; lassitude, with irregular chills and flushes of heat; an open, sharp, and soft pulse; a sense of pain, or heat and uneasiness, with distension and tenderness at the epigastrium and left hypochondrium. Sometimes the pains in these situations are severe and pulsative, or extend to the left shoulder and scapula; and there is generally more or less of nausea, expression of anxiety, and pallor of the countenance. In rarer instances the attack commences without any premonitory symptoms sufficient to attract attention; and cases even of death from hæmorrhage into the stomach have been observed by FRANK (*De Cur. Hom. Morb.* t. vi. p. 198.) and others to have occurred suddenly, without any external discharge or symptom indicating the cause of sudden dissolution. In some instances I have ascertained that, for a long time previously, evident symptoms of chronic gastritis had been present, of which the hæmatemesis was a consequence.

160. B. The *pathognomonic* phenomena of the

disease soon succeed to the above: the nausea is followed by increased pain, uneasiness, and tenderness at the epigastrium, and with vomiting of blood, either fluid or coagulated, pure, or mixed with the contents of the stomach. The blood, and other matters thrown up, come away with more or less effort; frequently with comparative ease, even when the hæmorrhage is the greatest, and seldom with much previous retching: it is sometimes gulped or eructated upwards. When the quantity of blood thrown up is great, the effort at ejecting it may sometimes occasion irritation in the pharynx, and excite coughing; and, from this circumstance, cause some doubt as to the seat of effusion; but the history of the case, and an attentive examination of the phenomena (§ 159, 160.), will show the nature of the disease.

161. The appearance of the blood varies with the quantity effused, and the time it has been retained in the stomach, but especially with the state of the vital energies, and of vascular action, previous to, and at the time of, the hæmorrhage. Where the discharge is attended by increased action, and the quantity is large, or when it has been poured from a considerable vessel or vessels, the blood is generally pure and unmixed with the inješta. Where it has been effused from an artery or ruptured aneurism, it is florid and fluid; but if it have slowly oozed from the congested mucous surface, or depended upon congestion or other disease of the spleen or liver, it is of a dark venous colour, sometimes grumous, at other times fluid, and either pure, or mixed with the secretions or other matters contained in the stomach. In some cases (the *morbus niger* of old authors) the blood is nearly black, of a tar-like hue, or grumous, particularly in the hæmatemesis occurring during the progress of old remittent and malignant fevers, where there has evidently existed for some time impaired tone of the mucous surface of the stomach and of its capillaries, and of the vessels of the spleen, with congestion of these viscera, and obstruction of the liver.

162. In some instances, particularly when the disease has been preceded by inflammatory symptoms referable to the stomach, membraniform, polypous, or fleshy substances, are found amongst the coagula ejected from this viscus. These substances evidently proceeded from inflammatory action in a part of the villous surface, with effusion of coagulable lymph, this action being followed by, or accompanied with, or even consequent upon, a more or less active hæmorrhage.

163. After hæmatemesis, the patient often experiences much relief from the more severe symptoms ushering it in; and this continues until shortly before a return of the attack, which may be repeated oftener than once, with intervals of relief of irregular duration. When the effusion of blood into the stomach is continued for a prolonged period, the vomiting of this fluid is repeated at short intervals. And occasionally the hæmorrhage occurs, particularly in those addicted to ingurgitation and the immoderate use of spirituous liquors, in short and slight fits, at short and regular intervals. I have remarked it, particularly in persons of a full habit of body who have been addicted to those indulgences, recur every morning, even for several weeks or months, with temporary relief to all the symptoms, and disappear

only occasionally for longer periods than 24 hours. Sometimes a single attack of considerable severity is followed by many months of comparative health; and when it is critical of engorgement of the spleen or liver, it may not again return, under proper treatment. When hæmatemesis is succedaneous or vicarious of some other accustomed sanguineous evacuation, it often recurs at regular intervals, as in the second variety of the affection. After an attack, the bowels are generally relaxed, and the dejections dark-coloured, from the presence of blood in them, and extremely foetid. Sometimes the stools are quite black, and of the consistence and appearance of tar. This state of the evacuations (*the melæna* of old authors) often continues for some time after the vomiting has ceased; and they are often preceded by colicky pains through the abdomen, distension, flatulence, tormino, and even slight meteorismus.

164. There is seldom much fever or heat of surface; but the pulse is quickened, sometimes full and developed, or even strong, in the more active or sthenic states of the disease, particularly at the commencement of the attack. But in the asthenic states of the system, or as the disease advances, and the attacks are repeated, it is commonly small, soft, and accelerated, and occasionally very compressible and open. The tongue presents various appearances, which depend more upon the concomitant and primary lesions producing the effusion of blood, than upon this occurrence alone. It is sometimes furred, but more commonly loaded at its base, or coated with mucus merely, or it is red, particularly its point and edges, and lobulated, or fissured: sometimes it is apparently raw and livid, particularly in the worst cases.

165. *C. Appearances on Dissection.*—There are few lesions to which the stomach and other abdominal viscera are liable, that have not been found in fatal cases of hæmatemesis. The chief of these, particularly in the primary forms of the disease, are—dark red, purplish, brown, or black patches, streaks, or spots, of the internal surface of the stomach; an enlarged, dilated, or injected state of the capillaries in this surface, permitting, according to the observations of PORTAL, injections thrown into the gastric arteries to pass into the cavity of the viscus; very rarely rupture of any of the vessels, excepting in connection with ulceration, or atheromatous deposits in their coats; generally a relaxed state of the vessels, with diminished cohesion, or a softened, dark-coloured, blackened, tumid, infiltrated, ecchymosed, and flabby condition of the villous and sub-villous tissues; occasionally a flaccid, dilated, and pale state of the whole organ, the vessels having been emptied by the hæmorrhage; sometimes similar alterations to the above of the internal surface of the duodenum, or of the œsophagus, either independent of (GAUBE, in *Rev. Med.* t. i. p. 394. 1825), or associated with, the foregoing lesions of the stomach; collections, varying much as to quantity, of coagulated, semi-coagulated, or grumous, dark-coloured blood in this viscus, and in the duodenum, and of a still darker, pitchy, and foetid blood, mixed with morbid secretions and fecal matters, in the intestinal tube; and a nearly empty state of the veins. In some cases, especially of the symptomatic forms, the mucous surface of parts of the small or large intestines

presents similar appearances to those seen in the stomach. In a few instances, there is but little change from the healthy state of this viscus, the principal morbid changes existing in the liver or spleen, or in the pylorus or œsophagus; and, in a few others, the mucous membrane is red, injected, and covered in parts by a layer of coagulated lymph or of jelly-like fluid. In addition to one or several of the above lesions, there have been observed, in rare cases, erosion of one or more arterial vessels (RICARD, LATHAM, CLARK, and myself) of the stomach; a dilated or varicosed state of the veins (RULLIER), and even rupture of the varicosed veins (STOLL, ROZIERE); great dilatation of the vasa brevia, the meseraic, mesocolic, and splenic veins, and ulcerations and perforations of the œsophagus and duodenum, as well as of the stomach.

166. In the more decidedly symptomatic and complicated states the various alterations to which the abdominal viscera are liable are severally observed, but those which are more directly connected with hæmorrhage into the stomach are—congestion, enlargement, and softening of the spleen, its vessels containing a black, semicoagulated, or grumous blood; unusual hardness and diminished size of this viscus, portions of it being converted into cartilage, and deposits of bone on its surface; congestion, tubercular formations, interstitial deposits, tumours, scirrhus, atrophy, and other changes in the liver, causing obstruction of the portal circulation; tumours pressing upon the vena porta, and lesions of its coats, or of parts connected with it, diminishing its calibre; enlargement or scirrhus of the pancreas (VAN DOEVEREN, myself, and others); alterations of the coats of the large vessels, and aneurisms, particularly of the aorta, opening either directly or mediately into the stomach, or œsophagus; adhesions of the spleen to the stomach, with perforating ulcers of the latter, penetrating into the former; fungous or other tumours of the stomach or pylorus (WHYTT, NIEMANN, PORTAL, &c.); scirrhus of the cardiac or pyloric orifices, tumours developed at the root of the mesentery, and organic changes of the kidneys. The most common of these are, the alterations of the spleen and liver, especially enlargement of the former, and lesions of the whole structure of the latter; changes affecting merely a part of the organ, or not materially obstructing the portal circulation, having but little influence in the production of hæmatemesis.

167. *D. Pathological Inferences.*—From the phenomena observed in connection with this disease, both during life and after death, it may be inferred—1st. That the effusion of blood into the stomach is sometimes a termination or consequence of active congestion, or of inflammatory irritation, of the villous surface of this viscus, and sometimes also of the parts of the digestive tube adjoining it—*inflammatory hæmatemesis*;—2d. That the hæmorrhagic discharge frequently arises from interrupted circulation in the spleen or vena porta, or both, and consequent congestion of the veins and venous capillaries of the stomach, causing increased action of the arteries, with dilatation of, and consequent effusion from, the exhalent pores of the congested surface—*congestive symptomatic hæmatemesis*;—3d. That the effusion occasionally proceeds from diminished or lost vital cohe-

sion of the villous surface, and impaired tone of the capillaries of the stomach, with general adynamia—*asthenic symptomatic hæmatemesis*;—4th. That, in rare instances, the hæmorrhage arises from an aneurism, from ulceration or perforation of an artery or vein; and more frequently from malignant, fungoid, or ulcerated tumours in the stomach, or near either of its orifices, &c.—*complicated hæmatemesis*.

168. iv. DIAGNOSIS.—The vomiting of blood is no proof that this fluid is effused primarily from the stomach, or even from the œsophagus or duodenum; for, as I have shown above (§ 91. 99.) very dangerous hæmorrhages often proceed from the posterior nares, fauces, or pharynx, and even from the respiratory organs, yet but little blood escapes externally from these situations, the greatest quantity passing into the stomach, whence, if it be considerable, it is afterwards thrown off by vomiting. Where the hæmorrhage takes place slowly, hæmatemesis does not occur, the blood having nevertheless flowed into the stomach, and thence into the intestinal canal, admixing with the secretions and alimentary matters, and colouring the dejections. Hence the presence of this fluid, even in the stools, is no proof that it has been effused either in the stomach or duodenum, as it may have been, as now stated, poured out from the œsophagus, or from the throat, &c., and have passed downwards instead of upwards. In cases, however, of hæmorrhage from the superior portions of the digestive tube, the blood is more or less changed or intimately mixed with the intestinal secretions and fecal matters; and the stools present, in their black colour, or their grumous, sanious, or tar-like appearance, indications of considerable remora, or of partial digestion of the effused blood in the alimentary canal.—These appearances may be thus modified, not only by this circumstance, but by the action of the acid in the gastric juice, or by acidity in the bowels, and by admixture with the biliary and pancreatic fluids. They will necessarily also vary with the quantity of blood effused, with the particular seat of effusion, with the state of the system, and with various concomitant circumstances, in respect of the causes and states of the digestive viscera.

169. The diagnosis, therefore, of true hæmatemesis from the vomiting of blood consequent upon the passage of this fluid into the stomach from the pharynx and adjoining parts, requires more attention than has been directed to it; and it is chiefly from a careful inquiry into the history and phenomena of the case, and from the premonitory symptoms referable to the stomach, spleen, or liver, that a correct opinion can be formed.—Where these symptoms have ushered in hæmatemesis, there need hardly be a doubt as to the stomach being the seat of effusion, and in this case the blood is very often dark-coloured, grumous, or coagulated, mixed with portions of ingesta, or with a pale or colourless ropy fluid, or with bile. In some cases, the passage of the blood over the glottis occasions more or less cough, and causes some doubt as to the source of hæmorrhage. In these, however, as well as in others, the absence of the symptoms ushering in, and characterising, hæmoptysis (§ 98, 99.), will distinguish hæmatemesis from that form of hæmorrhage. The dyspnœa, the bubbling sens-

ation in the trachea and about the top of the sternum, the florid and frothy appearance of the blood, or the presence of bubbles of air in it, are all present in the former, but are absent in the latter. Dr. WATSON very iustly remarks, that the symptoms usually succeeding the hæmorrhage, in either variety, afford much assistance in forming a judgment in some doubtful cases. Generally copious hæmoptysis proceeds for some time in a succession of mouthfuls, whereas there is mostly only one access of full vomiting; and, at the close of the former, the patient manifestly coughs up and expectorates smaller quantities of blood, whilst, a few hours after the latter, slight griping pains are felt in the abdomen, and stools such as I have above described are passed.

170. Other circumstances, also, connected with the diagnosis of hæmatemesis, ought not to be overlooked, especially the visceral diseases of which it is frequently a consequence, and the affections upon which it may be contingent, or of which it may be supplemental or vicarious. When blood is vomited in the course of *cancer* or *scirrhus* of the stomach or of its orifices, besides the symptoms indicating these maladies, this fluid is generally changed to a dark or black, grumous, or even inky appearance. When hæmatemesis occurs in the course of *scurvy* or of *purpura*, the circumstances are generally such as to leave us doubt as to its source. If it take place after a fit of *hooping-cough*, it is often difficult to determine whether the blood be discharged from the stomach, or from the respiratory passages; but attention to the phenomena just pointed out (§ 168, 169.) will obviate any error. When hæmatemesis proceeds from a ruptured *aneurism*, or from an ulcerated or ruptured vessel, the quantity of blood thrown up is generally great, and unmixed with other matters, and sometimes more or less florid and fluid. The exhaustion, fainting, pallor, and sinking attending it, are extreme, and a fatal result occasionally soon supervenes; but more frequently the exhaustion and sinking or syncope arrests the hæmorrhage, and the patient apparently makes a short or slight progress in recovery; but after some mental or physical excitement, or after slight exertion, the hæmorrhage recurs, and death either takes place, or another respite is obtained. In many of these extreme cases, a great part of the effused blood is retained, and found in the stomach and intestines on dissection.

171. v. PROGNOSIS.—In proportion to the severity of the symptoms referable to the stomach, liver, and spleen, particularly the pain, tenderness, anxiety, and fulness in these situations, the danger may be considered great. When these are very distressing, the quantity of blood ejected considerable or excessive, dark-coloured, pitchy, foetid, or grumous; when the vomiting is attended with sinking, with a very quick, weak, small, or an open and compressible pulse, or with signs of cachexia, and of organic disease of any of the abdominal viscera; if it be preceded by symptoms of inflammation of the stomach and adjoining viscera; if it have proceeded from acrid poisons, or from severe injury; if it be attended or preceded by dropsy, jaundice, hypochondriasis, or a sallow, sunk, earthy, or waxy state of the countenance or general surface; if fainting or syncope come on and be protracted, or recovery

from them imperfect; if the eyes be sunk, the features pallid and sharp; if there be great distension and tenderness at the epigastrium and left hypochondrium; and, lastly, if the patient have cold extremities and cold sweats, the danger is generally great, and, with the latter symptoms, extreme.—If the symptoms ushering in the attack, or preceding it for some time, be either imperfectly mitigated, and still more if they be increased by the discharge of blood, an unfavourable inference as to the issue may be formed. If hæmatemesis occur in the last stage of fevers or of the exanthemata, in the old and cachectic, in persons who have gone through a long course of intemperance, or who have laboured under chronic abdominal disease, particularly if the hæmorrhage be great, or impart not relief if moderate, danger may be inferred, although it may not be immediate in the latter circumstances.

172. When, on the other hand, the disease has been caused by a fit of anger, by the suppression of an accustomed evacuation—as the catamenia, hæmorrhoids, epistaxis; or if it be vicarious of these, or when it has occurred on the disappearance or suppression of an external discharge, eruption, &c. the patient being otherwise healthy, or not far advanced in life; if the hæmorrhage is not excessive, or very frequently repeated; if the premonitory and attendant symptoms be not severe; and if the attack be soon followed by relief, and a return of the appetite and digestive functions; if the abdomen and hypochondria be without tenderness, unnatural fulness, or tumour, upon an accurate examination, the prognosis may be favourable. Yet an attack of hæmatemesis should be always considered deserving the utmost attention and skill of the physician.

173. It has been generally stated, that periodic hæmatemesis vicarious of menstruation is unattended by danger; but there are many exceptions to this, arising from circumstances alluded to above (§ 171.). Mr. NORTH met with two cases of this form of the disease which terminated fatally. Upon the whole, therefore, the prognosis ought entirely to depend on the nature of the case, the age of the patient, the state of vital power and vascular action, and especially upon the complication, and the visceral lesions from which the attack proceeds. Dr. SCHMIDTMANN states, that in plethoric patients, and in cases not characterised by much visceral disease, hæmatemesis seldom proved fatal in his practice; and my experience confirms this result. In one case, where it recurred almost daily, a violent attack of gout and the subsequent regimen have prevented its recurrence for years. HOFMANN found five cases fatal out of eight, in those depending upon visceral disease, and broken down powers of the frame. When hæmatemesis assumes or even approaches to the characters constituting the *morbus niger* of the older writers, or indicating structural or malignant disease of the stomach or its orifices, the prognosis must be extremely unfavourable.

174. vi. TREATMENT.—The indications are—1st, to prevent, or to arrest the attack; 2d, subsequently to remove the pathological conditions, on which the hæmorrhage depends.—A. The physician has seldom an opportunity of prescribing for the premonitory symptoms of hæmatemesis; but cases sometimes present themselves,

in which it is necessary to have recourse to means, when these symptoms recur, *in order to prevent the seizure*.—In these circumstances, a moderate venæsection or cupping over the hypochondria, warm mustard pediluvia, a full dose of calomel, followed by cooling purgatives, cathartic enemata, cooling diaphoretics conjoined with demulcents, and spare farinaceous diet, will generally be efficacious, especially if excited or sthenic action be present. If the powers of life be depressed, instead of the bloodletting, a sinapism, or the warm turpentine epithem, may be applied over the region of the stomach. If the attack is apparently supplemental of hæmorrhoids, or of the catamenia, leeches may be applied around the anus, or near the groins, and aloetic purgatives should follow a full dose of calomel. A blister, or stimulating plaster, may also be applied to the sacrum. In cases of obstructed catamenia, cathartic enemata, with a full dose of spirits of turpentine, may be administered.

175. B. *During the attack*, the treatment must be directed conformably with the principles inculcated above. The question as to the propriety of arresting the hæmorrhage should hardly be entertained in this disease more than in hæmoptysis (§ 136.); for, although the hæmorrhage may sometimes proceed with less risk in the former than in the latter, or even occasionally with advantage; yet, as the quantity of blood thrown up from the stomach is no sure indication of the amount effused, and as the ends likely to be fulfilled by the internal discharge may be more safely attained by treatment, even when circumstances seem most favourable to the allowing of the hæmorrhage to proceed, it will be safer, as a general rule, to employ appropriate means to arrest the attack, and at the same time to accomplish all that the unrestrained effusion could have produced. Even in cases of supplemental or vicarious hæmatemesis, when it is supposed by some advantageous to allow a free discharge, danger may result; for the hæmorrhage may be fatal, although little blood is vomited, the stomach and intestines being filled with the effused fluid.

176. a. For hæmatemesis the means of cure are to be selected according to existing pathological conditions. In plethoric and robust persons; in cases depending upon congestion of the liver or spleen, or upon suppressed discharges; and where indications of increased or sthenic action are present—in those circumstances that might indicate the propriety of allowing a copious effusion to take place, it would certainly be improper to arrest the disease at its commencement by the internal use of powerful astringents; but it would be judicious to do so, by removing the pathological states of which the hæmorrhage is the effect, by *venæsection*—copious or repeated, according to circumstances; by *cupping* over the hypochondria; by *purgatives* and cathartic enemata, and by *external derivations*. In these, the more active states of hæmatemesis, *refrigerants*, cooling *diaphoretics*, and the other means advised in similar states of hæmorrhage (§ 35. *et seq.*), may be also employed. Whenever the disease continues, notwithstanding free vascular depletion, and external derivation, there can be no doubt of the propriety of having recourse to the more powerful astringents. In the more active forms, however, a full dose of *calomel*, followed in a few hours by a

purgative draught, and this by a cathartic enema, so as to procure copious alvine evacuations, should precede astringents. When the hæmorrhagic discharge is so copious as to forbid the delay which this practice would occasion, the calomel should be followed, in a very short time, by a full dose of oil of *turpentine*, given on the surface of milk, or of some aromatic water, or of this medicine conjoined with castor oil. If this draught be thrown off the stomach, it should be repeated; and it may be even again preceded by the calomel. Notwithstanding its usual nauseating effect, turpentine is generally retained in hæmatemesis; and it allays the vomiting, by arresting the hæmorrhage. It may be given in any dose, from twenty to thirty drops, every half hour, to half an ounce or more at considerable intervals; it may also be administered in *enemata*, or applied externally in the form of *liniment* (F. 311.) or *epithem*. I have resorted to this practice upwards of twenty years, and am convinced that it is safer and more generally appropriate than any other yet recommended.

177. *b. Cold*, in various modes of application—as in *enemata*, applied over the epigastrium, iced fluids, lemon and other water ices, taken into the stomach—has been directed in active hæmatemesis, and is often efficacious. But this treatment, as often merely suspends the hæmorrhage, which returns as soon as it is relinquished—sometimes with greater violence. It occasionally also merely checks the vomiting, while the sanguineous effusion still continues. It requires caution and discrimination, and ought not to be confided in alone, when the discharge is very profuse, or the case urgent. Where enlargement, or passive congestion, of the liver or spleen exists, the propriety of this practice is very doubtful. In passive hæmatemesis it is injurious.—*Nitre* (F. 95. 294. 644.) or *muriate of ammonia* (F. 864.) may also be tried in the active states of the disease, as being appropriate to them.

178. *c. Of the astringents*, the acetate of lead in large doses, with opium, or with pyroligneous acid, acetate of morphine, and kreosote, is the most efficacious. In the latter combination I have lately seen it successful. The combination mentioned above (§ 131.), as constituting Ruspini's styptic, or the *styptic solutions* prescribed in the appendix (F. 9—12.), or the *astringent balsams* (F. 8—22.), the subnitrate of bismuth or sulphate of zinc, with narcotics, and most of the substances already noticed under this head (§ 40, 41.), will often be of service. In the *passive*, or profuse states of the disease, the more tonic astringents—as the tincture of the muriate of iron, the oil of turpentine with aromatics, the sulphates and sulphuric acid with opium (Vogel, Ruland, Vicat), and infusion of roses; alum in milk-whey (Ström, Willich, Lindt, &c.), are generally useful.

179. *d. Emetics*, especially the sulphate of copper, or of zinc, are efficacious in some cases. They have been employed by Richter and Keck.—Dr. Sheridan states, that both he and his father have resorted to ipecacuanha emetics in hæmatemesis with general success. Very recently the *secale cornutum* has been recommended; and I have lately employed the *kreosote* in two cases with benefit, and have conjoined it with pyroligneous acid, acetate of lead, and acetate of mor-

phia.—Camphor is mentioned by Marcard, but it is useful chiefly as an adjunct to other means. The acid formed by the fermentation of buttermilk or whey is noticed by Van der Haar. I have seen it employed in some northern parts of Europe with benefit. Blistering the epigastrium is directed by Vogel and Togenburgher, and should not be neglected, if the other modes of counter-irritation already noticed (§ 36. 47.) be not adopted. Of the various anodynes, opium has been justly preferred by Young, Jones, Roeschlaub, Dörffmüller, and Marcus; the salts of morphine are now frequently employed, the one most congruous with the other substances prescribed being selected.

180. *C. The Treatment after the attack* is often of greater importance than that of the attack itself. It is chiefly then that the pathological states producing it can be removed. The means of cure should have strict reference to these states (§ 146.), and especially to those of the liver and spleen. There are few cases in which a judicious, regular, and persevering use of mild *purgatives* will not prove serviceable. When there is enlargement or engorgement of the liver, deobstruent and cholagogue aperients, occasional cupping below the right shoulder-blade, and a mild farinaceous diet, are required; calomel, blue pill, Plummer's pill, taraxacum, the super-tartrate of potash, and the neutral salts, being the most appropriate aperients. When the spleen is enlarged, purgatives are also necessary; but they should either be conjoined or alternated with tonics; and calomel be either laid aside, or be given with caution. In either state, purgative draughts (*Form* 99.), deobstruent liniments (F. 296. 311.) applied over the hypochondria, the nitro-muriatic solution taken internally and used externally, blisters and other external derivatives, will be useful. Cathartic enemata are also serviceable, especially when the bowels are very sluggish, or when the catamenia are interrupted. Most continental writers reprobate the more active purgatives, and venture only upon mild aperients, as rhubarb, manna, tamarinds, &c. When the disease depends chiefly upon relaxation, or irritation of the digestive mucous surface, this caution is very proper; but when the collatitious viscera are chiefly in fault, or when the catamenia are suppressed, the opinion of Dr. Bateman, given strongly in favour of the practice recommended by Dr. Hamilton, is perfectly just.

181. In hæmatemesis vicarious of menstruation, or of hæmorrhoids, purgatives are required; but they should be suited to the peculiarities of the case. When the amenorrhœa is connected with plethora, local depletions, from the groins or tops of the thighs, should be prescribed, and repeated just before the return of the menstrual period, or of the internal hæmorrhage; but when it is connected with adynamia, and a chlorotic or anæmic state of system, the preparations of iron, with myrrh, aloes, or other substances, which circumstances will suggest, should be employed.—In the aged, debilitated, cachectic, and in those addicted to fermented or spirituous liquors, purgatives should be given with caution, those of the mildest kind, in connection with tonics and restoratives, being selected.

182. When the stools continue black some time after hæmatemesis has ceased, this colour

not having arisen from the use of chalybeates, the exudation of blood from the upper parts of the digestive tube—either from the stomach, in so small a quantity as not to excite vomiting, or from the duodenum, or parts in the vicinity—may be inferred. In this case, purgatives, unless those of an astringent or tonic kind, as *Form. 99*, tamarinds, rhubarb, &c. would be injurious. In some prolonged cases of this kind in which I have been consulted, the spirit of turpentine, either in small and repeated doses, or in a full dose, has been most successful; but the external applications just noticed, and means appropriate to the complications which these cases usually present, should not be neglected.

183. *D.* The regimen in hæmatemesis does not differ materially from that already recommended. During the continuance of the discharge, total abstinence should be enjoined; but afterwards, mild, mucilaginous liquids, and farinaceous food in small quantity, may be allowed; and the transition to solid and more nutritious diet carefully and gradually conducted. The drink should be cooling and astringent; and appropriate to the states of the digestive organs, especially the liver and spleen. Those prescribed in the appendix (*F. 591—595. 915, 916.*) will be found very generally appropriate. Subsequently, change of air, regular exercise on horseback, and the use of the deobstruent mineral waters, as those of the Beulah Spa, or of Cheltenham, and the factitious Ems or Carlsbad waters at Brighton, ought to be recommended.

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VII. HÆMORRHAGE FROM THE INTESTINES AND MELÆNA.—*SYN.* Intestinal Hæmorrhage, Melæna, Μελαίνα, Μελαίνα Νόσος, Ἰλεὸς αἱματίτης, Hippocrates; Morbus Niger, Auct. Lat. var.; Fluxus Splenicus, Gordon; Dysenteria Splenica, Ballonius; Nigræ Dejectiones, Schenck; Secessus Niger, Hoffmann; Melæna, Sauvages, Sagar, Good; Melanorrhagia, Swediaur; Schwartze Krankheit, Schwartzer Blutfluss, Germ.; Maladie Noire, Fr.; Melena, Ital.

DEFIN.—The evacuations from the bowels, containing fluid, grumous, or coagulated blood, or presenting a black or pitchy appearance, with or without vomiting of blood.

184. I have considered melæna in connection with intestinal hæmorrhage, although the blood, colouring the evacuations, proceeds, perhaps, as frequently from parts above, as from those below, the pylorus: it may even come from the mouth, nares, or fauces, or from the respiratory passages, as I have already shown. The melæna of Hippocrates was the morbus niger noticed above, or a variety of hæmatemesis (§ 156.); the application of the term melæna chiefly to black-coloured dejections being of modern date, and I believe justly ascribed to SAUVAGES. I have viewed it according to this acceptation, and connected it with intestinal hæmorrhage, as it always arises either from this source, or from blood which has passed into the intestines from parts above the pylorus. At the same time, the frequent association of melanoid stools with vomiting of blood, in any of the states above described, has been kept in recollection, and considered as a result of the patholo-

gical conditions, causing the sanguineous effusion either in the stomach, or in the small intestines, or even in parts above the former viscus. — Indeed, melæna may occur not only in any of the circumstances in which hæmatemesis has been shown to supervene, but also in some of those connected with the other hæmorrhages already noticed. — This fact is fully demonstrated by observation, and by the writings specified above, as well as those referred to at the end of this article. Melæna may also appear in the course of cachectic maladies, especially scurvy, purpura, jaundice, &c.; or of adynamic or malignant fevers; or of malignant adventitious productions. — In order to arrange the various conditions in which blood is voided from the bowels, unconnected with hæmorrhoids, I shall notice—1st. *Intestinal hæmorrhage*, the stools not exhibiting the melanoid appearance—2d. *Melæna*, in relation to the sources of hæmorrhage, and to its complications.

185. i. *Intestinal Hæmorrhage, the Stools containing fluid or coagulated Blood, or Simple Intestinal Hæmorrhage*—*Hæmor. Intestinorum*—*H. Intestinalis*—occurs, 1st, from interrupted or impeded circulation through the liver; 2d, from congestion and loss of the vital tone of the capillaries of the mucous coat of the intestines; 3d, from ulceration of the intestinal tunics; and, 4th, from inflammatory irritation, or its consequences in these tissues. — A. *Intestinal hæmorrhage*, perhaps, most frequently arises from *impeded circulation through the vena porta*. Even when other pathological states seem to produce it, this may be a concurrent cause: hence, all those lesions of the liver that occasion some impediment to the portal circulation, may be connected with it. It has also been seen complicated with enlargement and induration of the pancreas, with engorgement of the spleen, with tumours about the root of the mesentery, and with enlargement of the mesenteric glands. These latter lesions are, however, rather contingently associated with the hæmorrhage, than concerned in the production of it; whereas, those alterations—as induration, atrophy scirrhus, enlargement, and tubercular or other changes of the liver, which impede or obstruct the circulation of the vena porta, are the efficient of the sanguineous effusion: hence the occurrence of intestinal hæmorrhage, not only in the course of these lesions, but occasionally also in connection with ascites or anasarca; or even with hæmatemesis, or after protracted intermittent or remittent fevers. In these cases, the blood is exuded from the intestinal mucous surface, as first inferred by GLISSON; and it is either fluid, grumous, or coagulated, and of a venous or very dark hue, as it is changed by the intestinal gases and secretions, or by its remora in the bowels. The appearance of the blood also varies according to the situation in which it is exuded.

186. B. *Impaired vital tone of the intestinal mucous surface* and of the capillaries supplying it, with congestion or engorgement of those vessels, is also a frequent cause of intestinal hæmorrhage. It is owing to this pathological condition, that blood is discharged from the bowels in purpura in the early course of fevers; in scurvy, and in other cachectic maladies. In fevers, however, there is probably more or less active determination to this part of the economy, especially in those cases in which the hæmorrhage occurs early,

or in which it proves critical. When it takes place in the course of petechial, putrid, or malignant fevers, it is generally passive, or entirely dependant upon the pathological conditions under consideration. In these cases, the blood discharged is generally fluid and grumous, and is of a venous or dark hue. When it is evacuated in an early stage of continued fever, or is critical, it is sometimes partially coagulated, or coagulates loosely after it is passed.

187. C. *Ulceration of the intestines frequently occasions hæmorrhage*. — The discharges of blood from the bowels in the advanced or latter stages of dysentery, or chronic diarrhœa, and of continued fever, are often owing to this cause, although they may also proceed, in these stages of fever from the pathological states just mentioned (§ 186.). Intestinal ulceration unattended by fever may also give rise, although rarely, to hæmorrhage. Instances have even occurred in which ulceration had gone on to perforation of the intestine, and adhesion of it to an adjoining viscus, the consequent hæmorrhage proceeding from the ulceration in that viscus. M. RAYER met with a case in which the duodenum and transverse colon were perforated and adherent to the liver, the ulceration in this latter organ having divided two branches of the *vena porta*, and occasioned fatal hæmorrhage.

188. D. *Inflammation of the bowels* is rarely attended by hæmorrhage to a great amount, unless it terminate in ulceration. It sometimes, however, gives rise to discharges of blood, especially when the cæcum or colon is affected; or when portions of the intestines are introsuscepted. — It has been supposed by some writers, that *blood may be discharged from the liver along the ducts*; but of this we have no satisfactory proof; and it is certainly by no means probable that this fluid will be passed from the secreting structure of this organ.

189. The appearance of the blood effused from ulcerated vessels, depends upon their seat and size, and upon the nature and stage of the antecedent disease. In far advanced cases of fever or dysentery, the blood is generally fluid, or grumous, and dark. When a large venous branch has been ulcerated, and the hæmorrhage has been very copious, large soft coagula, with much sanguineous serum, are generally passed by stool. In the inflammatory states of intestinal hæmorrhage, as in the early stages of acute dysentery, the blood is fluid, mixed with lymph and mucus, and not in very large quantity, unless ulceration has occurred. The blood discharged furnishes no sure indication as to the seat of the effusion. When, however, it is fluid and unmixed with fecal matters, the lower bowels are probably the seat. The ancients supposed that if the blood passed before the fecal matters, it proceeded from the lower parts of the bowels; and that, if it was voided after the fæces, it was effused by the upper parts: but this is no sure criterion. When the hæmorrhage is profuse, the blood acts as a cathartic, occasions severe colicky pains, and is often the only substance evacuated. — When it is very dark and grumous, or consists of small coagula, and of a sanious fluid, it has generally either been long retained, or been poured out in the upper portions of the canal. The appearance, however, very much depends upon the states of

the vascular system, and of the blood itself at the time when the hæmorrhage occurred; for, if it take place in the latter stages of adynamic or malignant fevers, the blood evacuated will be fluid or grumous as well as of a dark hue, or otherwise altered.

190. ii. *Melæna in relation to its sources and complications.*—When blood either flows into the stomach from any of the situations noticed above, or exudes from the internal surface of this viscus in so gradual a manner, or so slight a degree, as not to excite vomiting, but passes the pylorus, and when it is exhaled from the internal surface of the duodenum or small intestines, the evacuations often assume a perfectly black colour, and tar-like consistence. In hæmatemesis, the stools frequently have this appearance (§ 163.), owing to the passage of a portion of the extravasated blood into the bowels. This colour is manifestly owing to the admixture of the blood with the biliary and intestinal secretions, and to the action of the acid and gaseous matters contained in the digestive canal; although other explanations have been advanced (§ 192, 193.). Indeed, the evacuations often present, in nearly the same states of constitutional or visceral disease, every variety of colour and appearance, from these just described as constituting melæna, to those resulting from the manifest and abundant presence of pure or venous blood. Evacuations, more or less obviously sanguineous, must be referred either to some one of the sources just noticed, or to the passage of blood from the stomach into the intestines. When the blood comes from parts above the pylorus, the stools generally have more or less of the melanoid character, and there frequently is, or has been, hæmatemesis; but when it proceeds from the parts below, the stools vary with the quantity of blood effused, and other circumstances, and are generally as described above.

191. HOFFMANN first, and MORGAGNI afterwards, attributed melæna to the discharge of blood from the over-distended and ruptured venous capillaries of the intestines, caused by obstruction of the portal circulation and of the spleen. Dr. CULLEN considered this to be the usual origin of the disease; but admitted that a true *atrabilis* might be formed, and occasion all the phenomena attending sanguineous melæna. Dr. GOOD comprised, as a species of this malady, that morbid state which has been called green or black jaundice, and which is very different from melæna, and not necessarily connected with it, although the stools often have a dark green or blackish hue, owing to alteration of the bile, probably from torpor of the liver and prolonged retention of this secretion in the biliary passages. (See art. JAUNDICE.)

192. Whilst HOFFMANN and CULLEN attributed the colour of the dejections to the remora and alteration of the blood previous to effusion from the venous capillaries, PORTAL, BICHAT, and others supposed that, in consequence of the impeded or obstructed circulation through the mesenteric and portal veins, the blood was more strongly determined to the extreme arterial capillaries or exhalants of the intestines causing distension of, and effusion from, these capillaries; and that the change in the blood from an arterial to a black hue was produced subsequently to the extravasation by the acids and gases in the digestive canal. — In opposition to these opinions, Dr.

AYRE has contended that both melæna and the black variety of hæmatemesis (§ 156.) arise from the passage of blood from the minute ramifications of the *vena porta* in the secreting structure of the liver, consequent upon extreme congestion of these vessels; a very dark blood, instead of bile, passing by the biliary pores into the hepatic ducts, and thence into the duodenum. This hypothesis is, however, not supported by pathological research, and is almost as difficult to refute as to establish. If all cases of melæna were preceded by manifest congestion, and its consequence more or less fulness or enlargement of the liver, the probability of this being the source of melæna would be much stronger than it is; but indications of congestion or of enlargement of this viscus are not uniformly observed.

193. Cases sometimes occur in which a very dark, black, or greenish-black bile is passed, the stools being fluid, or of the consistence of treacle, owing to the circumstance just alluded to, and more fully explained in the article on the GALL-BLADDER, &c. I have met with such instances connected with chronic disorder of the respiratory and digestive functions. — Cases also are rarely seen in which melanotic matter is voided by stool, owing to the breaking down of tumours or adventitious encysted formations, containing this matter, as admitted by Dr. MARCARD and Dr. GOLDIE, or to the exudation of this matter from the follicles, where it may have been secreted, if, indeed, such an occurrence ever takes place. — In order to distinguish between melæna arising from the *effusion of blood*, or from *black bile*, or from *melanosis*, the stools should be diluted with water, or with a weak solution of soda, when blood will become apparent if the black colour of the evacuations have depended upon this cause.

194. SAUVAGES and PORTAL have distinguished as many *varieties of melæna* as there are circumstances in which it presents itself. The latter of these pathologists has illustrated an interesting memoir on the subject, by numerous cases; but the varieties adduced by him are deserving of notice, chiefly as indicating the pathological states on which this morbid condition is contingent, and not any modification of this condition itself; for, as he admits, the matters voided are nearly the same in all. The excretion of black or melanoid stools are, according to M. PORTAL, met with as follows:—*a.* In the advanced course of continued fever;—*b.* In connection with periodic fevers;—*c.* After strong mental emotions;—*d.* After the suppression or cessation of hæmorrhoids, of the menses, or of any accustomed discharge;—*e.* From irregular, suppressed, or misplaced gout;—*f.* In the course of scurvy, whether depending upon engorgement of the liver and spleen, or upon alteration of the blood, — *g.* In dropsy, owing to the associated visceral disease, or to the abdominal effusion, or to both. This enumeration is, however, defective, inasmuch as the frequent dependence of melæna, — *h.* Upon disease of the liver, spleen, or pancreas, unconnected with scurvy or with dropsy, — *i.* upon carcinomatous, encephaloid, or fungoid productions in some part of the digestive canal, — and, *k.* upon tumours developed in the mesentery, has been overlooked in it.

195. iii. CAUSES.—The remote causes of hæmor-

rhage from the intestines and of melæna, are not materially different from those that occasion *hæmatemesis* (§ 157, 158.). Sedentary occupations; intense or prolonged anxiety, and close application to study or business; full diet and neglect of exercise in the open air; frequent contrarieties; an irritable temper, especially in the melancholic, or sanguineo-melancholic temperament; the intemperate and daily use of spirits or other intoxicating liquors; general debility and cachexia; and the period of life between forty and sixty; are the most common *predisposing* occasions of the disease. Violent mental emotions, particularly fits of anger; great excess in eating or drinking; irritating or drastic purgatives, and acrid poisons; the suppression of sanguineous evacuations or accustomed discharges; the visceral and constitutional maladies just mentioned; and the causes generally productive of hæmorrhage; are the common *exciting* causes of intestinal hæmorrhage.

196. iv. The SYMPTOMS connected with melæna and discharges of blood from the bowels have been partially adverted to (§ 189.). There have commonly been disorder of the digestive canal, as loss of appetite, nausea, or occasional vomiting, and indications of visceral disease, for a considerable time before the attack. A sallow, dusky, waxy, or leaden hue of the countenance; a foul, loaded, dark, or otherwise morbid state of tongue, and tainted breath; a soft or spongy state of gums; fulness, tension, or griping pains of the abdomen, or fulness or enlargement in the hypochondria; oppression or anxiety referred to the præcordia or epigastrium; great debility, faintness, sense of sinking, or syncope; flatulence or nausea; and a tensive or dull pain in one or other of the upper abdominal regions; sometimes vomiting of blood; vertigo and coldness of the extremities; tormina, or colicky pains in the abdomen; and a weak, soft, or open sharp or bounding pulse; usually precede and usher in the discharges of blood by stool, or tar-like evacuations. In some instances, the motions are foetid or extremely offensive; and in all the exhaustion is great.—In a few cases, the quantity of blood passed from the bowels has been small; yet a fatal termination has occurred, preceded by tormina, and by fulness or tension of the abdomen. In these, the hæmorrhage has been concealed, the bowels being found upon dissection filled by semifluid or coagulated dark blood.

197. v. The DIAGNOSIS of intestinal hæmorrhage and melæna is often difficult; *first*, as respects the seat of effusion; and *secondly*, as regards the resemblance to other affections, particularly biliary disease and hæmorrhoids.—*a*. As to the source of hæmorrhage, the practitioner will be guided in forming his opinion by the circumstances already stated. He will take into consideration the probability of the blood having been poured out from parts above the diaphragm or pylorus, and the existing indications of such visceral disease as usually give rise to sanguineous effusion from the digestive canal.—*a*. If the colour of the stools be caused by black or morbid bile, dilution with water will impart to them a yellowish, greenish, or greenish-yellow hue. If it proceed from the matter of melanosis, dilution will give them neither a bilious nor a sanguineous tint. When the melanoid appearance depends upon

blood, the stools are generally offensive, and the sanguineous hue becomes very apparent upon dilution.—*b*. Intestinal hæmorrhage is often mistaken for internal hæmorrhoids; but it is readily distinguished from the latter, by the history of the case; by the tormina and spasmodic pains ushering in the attack; by the action of the bowels being unusual as to the time, and by the attendant sensations and symptoms; by the faintness and exhaustion attending it; by the existing evidence of visceral or constitutional disease; and by the imminent danger in which the patient is manifestly placed. Whereas hæmorrhoids are accompanied by the usual tumours, or by prolapsus of the inner coats of the rectum at stool, along with the tumours; and are generally followed by relief of most of the uneasy symptoms, the hæmorrhage occurring chiefly when the patient is passing his usual evacuation, which is commonly more or less fæcal, or unmixed with the blood which is discharged.

198. The *appearances on dissection* are nearly the same as are seen in fatal cases of *hæmatemesis* (§ 165.). The liver and spleen usually present structural change, and occasionally also the mesenteric glands, the pylorus, and pancreas. Congestion, dark-red, brownish, or purplish patches, ulcerations, excoriations, &c. of the digestive mucous membrane, are often observed, especially when the hæmorrhage occurs in an advanced stage of FEVER (§ 51.), in scurvy, or in purpura. In these, the mesenteric and portal veins are very generally loaded with dark, fluid, or thick blood. In some instances, however, the digestive canal is not materially altered; and, in others, it is unusually pale and bloodless. The blood itself is often manifestly changed, the hæmorrhage, as well as the melanoid state of the stools, depending partly upon this circumstance, and partly upon the lost tone of the digestive mucous surface and capillaries. This change obviously obtains in the diseases just mentioned, and in *scorbutic dysentery*, in which discharges of dark blood frequently take place from both the small and large intestines.

199. vi. PROGNOSIS.—Intestinal hæmorrhage and melæna are generally attended by danger; but much depends upon the pathological states of which they are consequences, upon the amount of the discharge, and the consequent exhaustion. When the effusion takes place early in fever or dysentery, is moderate, or is likely to prove critical, a more favourable opinion may be given; but with some reservation nevertheless. When sanguineous, or black stools, are consequent upon hæmatemesis, or upon hæmorrhage from parts above the diaphragm or pylorus, the prognosis will have strict reference to the related circumstances, and especially to the parts from which the blood appears to have directly proceeded; and will be either favourable or unfavourable accordingly; but, unless when the blood has come from the lungs, in the manner noticed above (§ 99.), or in some alarming states of hæmatemesis, or when there are very obvious visceral disease, and great exhaustion, the danger is much less than in true intestinal hæmorrhage and melæna.

200. vii. TREATMENT.—The stools ought to be attentively examined, in those diseases especially in which intestinal hæmorrhage and melæna are most likely to occur, and still more particularly

whenever faintness or exhaustion after a motion is complained of. For want of this precaution, hæmorrhage from the bowels has been often overlooked, and even fatal syncope has supervened, soon after the patient has been allowed to get upon the night-chair. In most circumstances of disease, in which this form of hæmorrhage is apt to occur, a bed-pan ought to be used, and the sitting or erect posture should not be assumed, until it is allowed by the physician.

201. *A.* The ancients supposed that blood effused in the intestines soon becomes putrescent; and they, therefore, prescribed purgatives to carry it off, and to prevent its injurious effects upon the system. This view of the matter is not without truth; but purgatives ought to be employed with caution, as they are apt to increase the hæmorrhagic state of the bowels, if they be of an irritating or relaxing kind. *Rhubarb*, with *ipecacuanha* and the *hydrargyrum cum cretâ*, and spirits of *turpentine* with *castor oil*, are the most safe, appropriate, and efficient purgatives in this disease; but they will often require to be assisted by mucilaginous enemata, or by injections containing these oils. When the liver is much affected, occasional doses of *calomel* may be given with *rhubarb*, or with opium or some other narcotic, as circumstances may suggest. The spirit of *turpentine* was prescribed first by Dr. ADAIR for this form of hæmorrhage, and afterwards by Dr. BROOKE in the same year that it was employed by myself in a different quarter of the globe. I have since always resorted to it, and in some very hopeless cases. In a very severe case of *melæna*, which I saw in 1823, with Mr. CHURCHILL, this medicine was successfully administered after the most powerful astringents had failed. It has likewise been recommended by Dr. W. NICHOLL and Dr. ELLIOTSON. It exerts either an astringent, or a purgative effect chiefly, or both, according to the dose and the mode of exhibiting it (§ 176.). It is also very beneficially applied over the abdomen, in the form of liniment, or of warm epithem or fomentation.

202. The other means of cure should entirely depend upon the related pathological states, and upon the nature of the malady, on which this is contingent. If it occur in the course of *putro-dynamic fever* (§ 491.), the means there advised should be employed; if in the progress of *scurvy* or *purpura*, the remedies directed for these diseases, in addition to those now suggested, ought to be prescribed. If intestinal hæmorrhage depend upon structural change of the liver or spleen, the treatment is not materially different from that advised for *hæmatemesis*, in similar circumstances; but when the discharge is profuse, astringents must, in the first instance, be decidedly employed. Of these, the *oleum terebinthinæ*; the acetate of lead with opium, or with acetic acid and morphine; the gallic, citric, or other vegetable acids; the mineral acids and the metallic salts; the chlorides, especially the chloride of lime; *kreosote*, and the most powerful vegetable astringents should be preferred.—When nervous symptoms are present, camphor may be conjoined with either of these, or with opium; and, when the crisis of the blood, as well as the vital cohesion of the tissues, are manifestly impaired, the chlorides, or the muriate of ammonia, or the

nitrate or the chlorate of potash, &c., may be given with such of the astringents as are congruous with them.

203. *B.* The diet and regimen should be even more rigidly attended to than in hæmatemesis. The former ought to consist chiefly of farinaceous and mucilaginous substances. Fruits and slops are generally prejudicial. Vermicelli, or rice boiled to a pulp, and moistened with beef tea, or veal broth, is generally suitable. Perfect quiet of body and mind, and the recumbent position, ought to be maintained. Wine is sometimes necessary, especially in the circumstances requiring the use of opium. Lime-water, alum-whey, lemonade, imperial, or any of the beverages prescribed in the APPENDIX (F. 588. *et seq.*), may be employed as the patient's drink. When blood has entirely disappeared from the stools, attention ought to be carefully directed to the excretions and the digestive functions, and the strength restored by mild and light nourishment, the quantity of which should be gradually increased to a very moderate amount. The causes, and pathological states on which this affection depends, ought to receive attention, as the removal or mitigation of these is the most sure means of preventing a recurrence of the attack. When convalescence is not retarded by disease of the liver, then wine with seltzer-water, the preparations of bark, and various tonic astringents may be allowed; but the bowels ought at the same time to be duly regulated. (See also the *Treatment of Hæmatemesis* (§ 174.))

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VIII. HÆMORRHAGE FROM THE URINARY ORGANS.—*SYN.* *Hæmaturia* (from αἷμα, blood, and οὔρω, to urinate.), *Auct. var*; *Sanguis in Urina*, Celsus; *Mictus Cruentus*, Sydenham, Hoffmann, and Juncker; *Mictus Sanguineus*, *Hæmorrhagia ex Viis Urinariis*, *Hæmorrhœa Vium Urinariarum*, Swediaur; *Blutharnen*, Germ.; *Pisement de Sang*, *Hématurie*, Fr.; *Orina de Sangue*, *Ematuria*, Ital.; *Bloody Urine*, *Hæmorrhage from the urinary passages*.

DEFIN.—The urine, containing or consisting of a fluid, grumous, or partially coagulated blood, the colour varying from red to brown or black,

sometimes with small fibrinous coagula, the patient generally complaining of uneasy sensations in the region of the kidneys or bladder.

204. i. The CAUSES of hæmaturia are—*external injuries* on the loins, hypogastrium or perinæum; falls, or concussions of the trunk; prolonged or severe exercise on horseback; riding in carriages over a rough or broken pavement; violent muscular exertions;—*Internal irritants*, as calculi formed in the kidneys or bladder, and acrid substances taken into the stomach, absorbed into the blood, and carried to the kidneys, as turpentine, cantharides, savine, and various other medicines;—and whatever inflames, or causes congestion of the urinary organs, as the application of cold, the suppression of accustomed discharges, &c.—Hæmaturia may also be produced by the concurrent influence of plethora, venereal excesses, violent fits of passion, &c.; but the most common causes are organic changes implicating the kidneys or bladder; general cachexia, as scurvy and purpura; malignant and exanthematous fevers; and even still more common are calculous formations and the other internal irritants specified above.—This disease is most frequent in males, in persons advanced in life and in the aged; in plethoric habits and sanguineous or irritable temperaments; in the scrofulous and calculous diathesis; in those who pass an indolent and luxurious life, and who are addicted to venereal indulgences, and to the intemperate use of intoxicating liquors.

205. a. *Idiopathic hæmaturia* is extremely rare. CULLEN states that he never met with it. J. P. FRANK rarely saw it. Unless when caused by cantharides or turpentine, it is certainly very seldom observed; and even when thus induced the hæmorrhage is generally scanty, and the consequence of inflammatory irritation. Indeed, hæmaturia is often merely a symptom of inflammation of either the kidneys or urinary bladder, the quantity of blood effused being small.—b. *Supplemental hæmaturia*, or that which is vicarious of the catamenia, or of hæmorrhoids, is equally rare, although its occurrence has been much insisted upon by foreign writers; and it is extremely probable that organic lesion is more or less concerned in the production even of this variety. CHOPPART, however, mentions an instance of hæmaturia consequent upon irregular menstruation, in which the urinary organs presented no change after death.—c. *Critical hæmaturia* is seldom observed, although FORESTUS, ETTMÜLLER, AMATUS LUSITANUS, MARCELLUS DONATUS, ZACUTUS LUSITANUS, HOFFMANN, JUNCKER, CHOPPART, LATOUR, &c., insist on its importance during inflammatory fevers, and in plethoric persons. They also consider that, of all critical hæmorrhages, it should be the least interfered with. When hæmaturia is actually critical, it seems to depend upon a similar state of local action and of vascular fulness, general or local, to that which obtains in the more idiopathic and vicarious states of the disease.—It is chiefly, therefore, as a *symptom* of previous disease, local or constitutional, or even of both, but especially of urinary calculi, that hæmaturia is met with in practice.

206. ii. The DESCRIPTION of hæmaturia comprises—1st. The appearances of the urine and of the blood contained in it; 2d. The symptoms attending this morbid state of urinary excretion,

and their relation to the seat of hæmorrhage; and, 3d. The pathological states of which hæmaturia is the consequence.—A. The *urine* may contain much or little blood; or the fluid evacuated from the bladder may be almost entirely blood. Its colour may be either red, or brownish red, or nearly black or inky. Sometimes the urine is passed *guttatim* with pain and scalding; and with a constant or frequent recurrence of the desire to empty the bladder, although but little or even no urine is contained in it. At others, the blood and urine are retained in large quantity, efforts at evacuation being ineffectual, owing to coagula obstructing the outlet from the bladder or being lodged in the urethra. Even when the obstacle is removed by a sound or catheter, the urine often presents a bloody, sanguineous, or chocolate appearance for several days, although the hæmorrhage may have ceased, and is sometimes extremely offensive from the decomposition of the clots retained in the bladder, or from the action of the urine upon them. Occasionally this fluid is grumous, very dark, or even black, or contains a number of small brown coagula. In some cases, fibrinous substances of various forms and sizes are evacuated, consisting of the fibrine of the effused blood, moulded or changed by the parts through which they have passed. In others, a stringy or gelatinous substance, with dark coagula, or black grumous matter, is observed in the urine; and occasionally mucous, muco-puriform, or gravelly matters are also found.

207. B. The *symptoms* of hæmaturia vary with the seat of hæmorrhage. (a). When the *kidneys* are the parts chiefly affected, the attack is usually preceded or attended by chills or rigors; by coldness of the extremities, and particularly of the hands; by deep-seated pain, or a sense of weight, or of tension, or of heat in the loins; by general lassitude; and often by anxiety, or colicky pains in the abdomen; by frequent desire to pass the urine; sometimes by numbness in one or both thighs, and pain in the course of the ureters, or by nausea or retchings. If cantharides or savine have been taken, a burning heat is felt in the urinary passages, with priapism, scalding, and pain on discharging the urine, &c.—(b). When the *bladder* is the seat of hæmorrhage, a frequent desire, or great difficulty, to excrete the urine; tenesmus, or pain or heat about the anus; a sense of tension or of warmth, with itching above or behind the pubis, or of dragging in this situation; pain or aching in the perineum, frequently with febrile symptoms or nausea, and constipation of the bowels, are complained of. The severity of the local symptoms, as well as the state of constitutional disorder, vary extremely, according to the grades of vital power and of sthenic or asthenic vascular action, and to the organic changes or nature of the local irritation of which the hæmorrhage is a consequence.

208. The above symptoms, especially when they precede the attack, indicate inflammatory irritation or active congestion of the urinary organs. But sometimes the hæmorrhage takes place suddenly, and in great abundance, without any precursory sign. In some cases, also, the symptoms are very obscure. In most of these, however, it will be found that the blood comes from the kidneys, and that its effusion is caused by calculi in these organs. Even when the blood is discharged

from the kidneys, the symptoms may be most severe in the region of the bladder, owing to the irritation and interrupted excretion of the effused blood, or even independently of these circumstances. Indeed the symptoms have not infrequently been referred to the sound or least affected organ, whether the kidneys or bladder. More commonly, however, they indicate the seat of hæmorrhage with much precision, when duly investigated.—Dr. PROUT very justly remarks, that, when the blood is equally diffused through the urine, it generally proceeds from the *kidneys*; and that when it mostly comes away in greater or less quantity at the termination only of the urinary discharge, the urine having previously flowed off nearly pure, it is effused from the *bladder*. In the former case, also, coagulated fibrine in the shape of worms, moulded in the ureter, and subsequently washed out by the urine, are not infrequently met with. When these appear, the diagnosis is unequivocal, especially when they are consequent upon the symptoms above referred to the kidneys, or upon other evidence of the existence of calculi in these organs. On the contrary, when there are symptoms of stone in the bladder, or of other disease of this viscus or of the prostate gland, indications of renal disorder not being present, the bladder may be considered the source of hæmorrhage; and this inference may be likewise drawn, if severe pain above or behind the pubis be complained of; if the bladder become suddenly distended; if the passage of urine be interrupted or entirely obstructed, and if other signs of coagula in the bladder be present, although the external discharge may be small.—When the blood passes, *guttatim*, without urine, it manifestly comes from the *urethra*. It may, however, proceed from the upper parts of the urethra, and flow back into the bladder, and be voided with the urine. Rigors or horripilations not infrequently attend hæmorrhage from this, as well as from other parts of the urinary passages.

209. *Hæmorrhage into the bladder*, from either the kidneys or ureters, or the upper part of the urethra, but more especially from the *parietes of the bladder itself*, may be followed by *coagulation of the blood* in this viscus. This is not unlikely to take place, if the effusion be sudden and copious; and whenever it does, the patient experiences great suffering. When the coagulum is large, it often causes retention of urine; and when it is small, it sometimes becomes the nucleus of calculous formations. The principal *indications of the existence of coagula* in the bladder are pain, distention, and weight, with tenderness or tension above and behind the pubis, with a sense of dragging in this situation, and of aching in the perineum, preceded or attended by the excretion of a small quantity of pure or recently effused blood by the urethra, and frequent desire to pass the urine. When this secretion is retained, distension of the bladder so as to occasion a tumour above the pubis, with tenderness and tension of the hypogastrium and other distressing symptoms are also present. If the urine present, after a scanty discharge of recently effused blood, and more or less of the above symptoms, a brown or chocolate appearance, or deposits a heavy dark sediment, and if frequent efforts to urinate continue, the evidence of coagula in the bladder is still stronger (§ 208.).

210. *C. Duration, &c.*—Hæmaturia may continue a few minutes only, or many hours, or even days. It may *remit* or *intermit*, or recur at short or very distant intervals. It may be even *periodic*, the attack returning more or less frequently. Periodic hæmaturia is not uncommon in miasmatic climates, and it is, although rarely, even seen in this country amongst those who have been exposed to malaria, or have resided long in warm climates, or suffered from periodic fevers. In a case of this kind detailed by Dr. ELLIOTSON, hæmaturia accompanied the cold fit of ague, and was cured, along with the ague, by the sulphate of quinine. Hæmaturia may be also periodic when it is vicarious of the catamenia or of hæmorrhoids. When it depends upon calculi in the urinary organs, its recurrence may be expected until the cause is removed; when it proceeds from malignant or other organic disease of these parts, it is most commonly persistent, recurring, or severe, or even fatal in its consequences.

211. *D. The Pathological states of which hæmaturia is generally a consequence* have been already noticed, but some of them require more particular mention.—*a.* When the hæmorrhage is consequent upon *inflammatory irritation*, the symptoms referable to either the kidneys or bladder are well marked, and more or less symptomatic or irritative fever is often present. Fibrinous substances are also generally found in the urine, and the discharge of blood is seldom considerable, and never excessive. Hæmaturia, from inflammatory action of the inner coats of the bladder, is stated by M. RENOULT to have been very prevalent among the French troops in Egypt. It was characterised by pain in the region of this viscus, extending to the glans penis, with frequent and urgent desire to pass urine, the last drops often consisting of pure blood, and their discharge being attended by very acute pain.—*b.* Very nearly the same phenomena are observed when the complaint depends upon the irritation of *calculi in the kidneys or bladder*. When these exist in the latter viscus, mucous or muco-puriform matter, or a gelatinous lymph, is sometimes found, along with more or less blood, in the urine.—*c.* The irritation of a *calculus in the ureter* may occasion hæmaturia; but the symptoms, as respects either the appearances of the urine, or the seat of uneasiness, may not be different from those already mentioned. In some cases, the pain felt in the situation or course of the ureter; the sense of weight, uneasiness or pain in the lumbar region of the same side; and the numbness or cramps of the thigh or leg of that side, will indicate the source of disorder.—*d.* The hæmaturia which occurs in the course of typhoid or putro-adynamic fevers, of scurvy, and of purpura generally arises from *relaxation of the extreme vessels of the kidneys*, and of the urinary mucous surfaces, in connection with *alteration of the blood itself*. In these, the blood is sometimes effused in considerable quantity; but it is never coagulated, although it is occasionally grumous. It is more intimately mixed with the urine than in other circumstances; the excreted fluid being generally dark, and either offensive or soon becoming so.—*e.* Hæmaturia may also arise from *malignant disease of the kidneys, bladder, or prostate gland*, especially *fungoid or encephaloid*

productions in these organs. In some cases arising from this cause, the hæmorrhage has been excessive, the urinary bladder being distended by fluid and coagulated blood, especially when the effusion has taken place from this viscus, or from the prostate gland. An interesting instance of hæmorrhage into the bladder from fungoid tumours connected with the prostate, where it was necessary to perform the high operation in order to remove large and firm coagula that had formed, is recorded by Mr. COPLAND HUTCHISON (*Lond. Med. Repos.* vol. xxii. p. 128).—In some cases of malignant disease of the urinary organs, the colouring parts of the blood appear as a reddish sediment in the urine.—*f.* *Softening of the kidneys, or the internal tunics of the bladder* may be followed by hæmaturia, without being suspected during the life of the patient; but these lesions are very rare.—*g.* *Ulceration of the inner coats of the bladder* very rarely occurs, unless as a consequence of simple cystitis, or of cystitis associated with calculi in this viscus; or without very manifest symptoms of these diseases. In these cases, the hæmaturia is preceded by such symptoms for a longer or shorter period, and the urine has been loaded by mucous or muco-puriform matter.—*h.* *A varicose state of the veins*, particularly about the neck of the bladder, has been noticed by several writers as a cause of hæmaturia (*Hæmorrhoides vesicæ*, auct. var.), and by some in connection with the gouty diathesis; but this change is very seldom observed.—*i.* *Other organic lesions* of the kidneys have been mentioned as causes of hæmaturia; but they can be merely suspected during life, unless they be attended by, or consist of, tumours of the organ, and give rise to pain in the loins and numbness of the thigh of the same side, with the appearances of the urine already noticed (§ 208.); and even then, their nature will seldom be fully ascertained.

212. iii. DIAGNOSIS. The urine may present appearances very closely resembling hæmaturia and yet be perfectly free from blood. The internal use of various vegetable substances, especially the prickly pear (*Cactus opuntia*), beet-root, madder, sorrel, logwood, &c., will give a red colour to the urine, that will be distinguished with great difficulty from that produced by blood. The reddish pink hue of the urine in some inflammatory diseases, will hardly be confounded with hæmaturia.—The dark, black, or inky state of the urine, noticed by several writers, may arise either from the presence of blood, or from the principal elements of bile being excreted by the kidneys with the urine, whilst the liver is obstructed or incapable of performing its functions, as in jaundice. Cases in which black urine has been voided, are recorded by RHODIUS, SCHENCK, SAILLENS, BONET, COWPER, RIEDLIN, BARTHOLIN, LOMMIUS, STOLL, NICOLAI, MARCET, E. THOMPSON and myself. GALEAZZI met with it complicated with hæmatemesis. BONET, after recording a case in which the urine had the appearance of ink, states, that he has observed this in hypochondriasis, where it has occasionally proved critical. In a case treated by me fifteen years ago, a perfectly black sediment was deposited after the urine had stood some time. This condition of the urine may be produced either in the way just stated, or in the manner I have explained when detailing the case just alluded to (*Lond. Med. Repos.* vol. xviii. p. 161.)—by sup-

posing the arterial capillaries and discerning apparatus of the kidneys to be relaxed to a degree sufficient to allow red globules of the blood to escape with the excreted urine, the black colour arising from the action of an acid, or of the saline ingredients of the urine on these globules.

213. When blood is present in the urine in any considerable quantity, a portion of it sinks to the bottom of the vessel, and the transparency of the secretion is disturbed. The reddish pink urine without blood is generally clear. A mixture of urine and blood tinges a piece of white rag dipped into it of a red colour. Dr. WATSON observes that, upon boiling urine containing blood, a brown coagulum will be formed, and that the fluid part will regain the natural colour of urine. When the black hue depends upon the presence of bile, it passes to a yellowish or greenish tint upon dilution with water; if it proceeds from blood, a reddish colour becomes apparent, especially if a little subcarbonate of soda be added.

214. iv. PROGNOSIS.—The prognosis must depend chiefly upon the pathological states producing the hæmaturia. If these consist principally of inflammatory action or irritation, or of active congestion, a severe, although not necessarily a dangerous, disease is indicated. If there be evidence of calculi in the kidneys or bladder, a nearly similar opinion may be formed, but much will depend upon the circumstances of the case, and the states of associated disorder, particularly of these organs. If hæmaturia occur in aged persons and broken down constitutions, or if there be reason to infer the existence of malignant or serious organic change in any part of the urinary passages, the prognosis must be very unfavourable. The amount of hæmorrhage is in itself rarely fatal, although the retention of coagula in the bladder is always dangerous, and often fatal, from the consequences which result, particularly as respects the excretion of urine. When hæmaturia appears in the course of adynamic, continued or exanthematic fevers, or in purpura, &c. an unfavourable opinion of the result should be entertained.

215. v. TREATMENT.—*a.* When bloody urine proceeds from inflammatory irritation or active congestion, or is supplemental of some other sanguineous discharge, and especially when it is attended by severe pain or symptomatic fever, or increased vascular action, bloodletting, and particularly cupping on the loins, or perineum, according to the seat of the chief affection, should be practised. In these, as well as in other circumstances, demulcent diluents, and oleaginous or mild aperients, are more or less beneficial. When acrid substances have caused the complaint, these are especially required; and the almond emulsion, the gums, the decoction of althæa, the infusion of linseed, &c. may be abundantly exhibited, either alone or with small doses of camphor, or with paregoric elixir. When the hæmorrhage is induced by calculi, local depletions, and demulcents, conjoined with the opiates or other anodynes, or these latter, either with the alkaline subcarbonates, or with diluted muriatic acid, according to the state of the urine, the warm bath, and emollient enemata, will generally be of service.

216. *b.* When hæmaturia presents a passive character—when it is attended by great debility or vascular asthenia, or supervenes in the course of

the maladies already mentioned, camphor should be given in considerable doses, with small quantities of opium or acetate of morphia. In such cases, also, the tincture of the muriate of iron; or the balsams or terebinthines, particularly the balsam of Peru, copaiba, the Canadian balsam; or the spirits of turpentine in small doses; or the infusion of uva ursi, or of the diosma crenata (F. 231.) may be employed, and conjoined with opiates or other anodynes according to circumstances. FRANK advises cold clysters with vinegar, and tonic astringents internally. Dr. PROUT found an obstinate case of profuse hæmaturia yield at last to a combination of colchicum with uva ursi. Where sabulous or calculous formations are concerned in the production of the hæmorrhage, or when the hæmaturia occurs in the gouty diathesis, this combination, either alone or with the alkaline subcarbonates, seems very appropriate. When the hæmorrhage is so very profuse as to require to be immediately arrested, dry cupping on the loins, the warm bath, or warm pediluvia, spirits of turpentine, given internally and administered in enemata, the superacetate of lead with opium, kréosote, and the other active astringents already mentioned (§ 40. 178.) are the most to be depended upon.

217. *c.* If *coagula* form in the bladder, the serious consequences they usually induce should be prevented as much as possible by breaking them down by means of a catheter; and by injections of tepid water, or other emollient fluids, containing a small quantity of the subcarbonate of soda, or of potash. This practice has been advised by DESAULT, J. P. FRANK, HOME, LARREY, HOWSHIP, and others; and should not be delayed, or partially or negligently adopted.

218. *d.* There have been some other means recommended by writers on the disease, but few of them are deserving of notice. CÆLIUS AURELIANUS advised bloodletting, the injection of astringent fluids into the bladder, and the application of cold epithems to the pubis; but considered diuretics to be injurious. SYDENHAM recommended depletion, and astringents with narcotics; BUCHAVE and LOEFFLER, frequent doses of ipecacuanha; GOOCH large doses of opium; MOYLE, SCHOENFELD and others, the terebinthines; BISHOP, the decoction of the leaves of the Persian almond; and J. P. FABER, the application of lead or of its preparations over the region of the kidneys.

219. *e.* The regimen during and after hæmaturia should be directed in conformity with the seat of the disease, and with the principles already developed. The diet should be chiefly farinaceous and mucilaginous; and the beverages emollient and slightly astringent. The waters of Bath, or those of Ems and Carlsbad, or of Selters and Geilnau, or the factitious waters prepared at Brighton, may be tried. When the bowels require assistance, oleaginous purgatives, especially castor and olive oil, are upon the whole the most appropriate, and may be freely administered in enemata. The patient should avoid riding on horseback or in a carriage; but, if the latter cannot be dispensed with, an air-cushion should be used.

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IX. HÆMORRHAGE FROM THE UTERUS. — SYN, *Sanguinis Stillicidium ab Utero*, Ballonius. *Hæmorrhagia Uterina*, Juncker, Good. *Hæm. Uteri*, Hoffmann. *Menorrhagia*, Sauvages, Vogel, Cullen, &c. *Fluor Uterini Sanguinis*, Boerhaave. *Hysterorrhagia sanguinea*, Swediaur. *Metroorrhagia*, Sagar, Ploucquet, J. P. Frank. *Metro-hæmorrhagia*, Auctor. *Blutgang*, *Mutterblutfluss*, *Gebärmutterblutfluss*, Germ. *Perte de Sang des Femmes*, *Perte Rouge*, *Perte Uterine*, Fr. *Perdita di Sangue*, Ital. *Uterine Hæmorrhage*, *Flooding*.

220. DEFIN. — Discharge of blood from the vessels of the Uterus, independent of the menstrual evacuation.

221. From this definition it will appear, that *Menorrhagia*, or excessive menstruation, should not be confounded with *Metro-hæmorrhagia*, or uterine hæmorrhage. But it should not be overlooked that the former often passes into the latter. *Menorrhagia* is treated of in the Article MENSTRUATION: hæmorrhage from the uterus only, legitimately falls under consideration at this place. *Metroorrhagia* (from μήτρα, the womb, and ῥήγνυμαι, I break forth) has been very generally employed to denote this disease; but it is evident that αἷμα should be interposed, in order to convey the idea attached to this term, and that the name, *Metro-hæmorrhagia* should be preferred. —

The division of this subject, adopted by M. DUGES and some others, although considered unnecessary by M. DESORMEAUX, may be here followed with advantage. I shall, therefore, consider uterine hæmorrhage as it occurs—1st. Before puberty; 2d. During nubility, or before the cessation of the menses:—3d. At the critical period of life, and during old age; and, 4th. In connection with the puerperal states, or during pregnancy, and after delivery.

222. i. Hæmorrhage may take place from the uterus, or in a slight degree from the vulva, at any period *previously to puberty*; but this very rarely occurs, unless as a consequence of masturbation, or of premature sexual connection, or of genital excitement. The destructive vice, masturbation, exists much more frequently amongst young females, and is acquired at an earlier age than is generally supposed even by medical men; children of the age even of two or three years, sometimes acquiring it from nurse-maids, or from older children. Two or three instances of this have accidentally come to my knowledge. Both at the infirmary for children, and in private practice, cases of hæmorrhage from the female genitals occurring at irregular periods previously to puberty, have come before me; as well as instances of premature menstruation, the discharge recurring after monthly intervals; and, in every case, a strict investigation has led to the inference as to the cause already stated. Precocious menstruation is much more rare, than uterine hæmorrhage before puberty; the latter, may be distinguished from the former, by the attendant injury to the general health, and loss of the healthy look, and complexion: whereas, the former is accompanied by a more rapid growth of the frame, and by other signs of puberty, as the development of the mammæ, &c.

223. ii. From the 12th to the 16th year, in our climate, the female sexual organs are developed so far as to give rise to the menstrual discharge. But the occurrence of this discharge, at or for some time after the earlier of these years, is not an indication of these organs being capable of performing all their functions, inasmuch as impregnation is rarely effected before fourteen years of age. *Metro-hæmorrhagia, occurring after puberty*, independently of the puerperal states, or menorrhagia proceeding so far as to amount to a true hæmorrhage, is liable to recurrence, at irregular or regular periods. When the hæmorrhage is slight, and returns at the monthly periods, the observations offered when treating of *excessive MENSTRUATION* are altogether applicable. But when it is very large, or of frequent, or of habitual recurrence, it is most exhausting and injurious to the system, although it may be entirely independent of any structural lesion. A female may experience only one attack, arising from excessive determination of blood to the uterus, caused by various exciting causes: and, even when the attacks recur, they will be much influenced by diet and regimen. Whenever they return, whether at monthly, at irregular, or at short intervals, or whether the discharge be continued or remittent, especially if the female have been or is married, or has had children, some morbid structure in the uterus should be dreaded, and a careful examination made *per vaginam*. Uterine hæmorrhage at this epoch, unconnected

with impregnation and the puerperal states is, either, 1st. *Sthenic* or *active*—depending upon determination of blood to, or upon inflammatory irritation of, the uterus; or, 2d. *Asthenic* or *passive*, arising from impaired tone of the uterine vessels and parietes; or, 3d. *Symptomatic* of organic lesion. But before the phenomena ushering in or attending these states of the disease are described, the causes which induce them may be detailed.

224. A. Causes. — a. The *predisposing causes* which are more especially concerned in the production of this form of uterine hæmorrhage, are the epochs at which the menses first appear and at which they altogether cease; the menstrual periods themselves; general or local plethora; excessive sensibility of the uterus, arising either from original conformation, or from inordinate sexual excitement, or masturbation; frequent or difficult child-bearing, or abortions, especially if they have succeeded each other rapidly; constriction of the abdomen by tight corsets (MAURICEAU, RANOË); too much warmth applied to the lower parts of the trunk and thighs; very hot seasons; the habitual use of exciting liquors, of rich and high-seasoned dishes; and a frequent recourse to warm baths. These predispose chiefly to the more *active* states of uterine hæmorrhage, but the following favour the occurrence of the more *passive* forms;—especially weakness of constitution, general debility, and cachexia; the lymphatic temperament; imperfect or unwholesome nourishment; chronic or excessive discharges, particularly prolonged lactation; the depressing passions, as grief, sadness, anxiety, &c.; the abuse of relaxing beverages, &c.

225. b. The *exciting causes* are, stimulation of the vascular system generally, or of the uterine organs in particular, by the use of hot baths, of intoxicating liquors, of acrid purgatives, or of emmenagogues, and by excessive sexual indulgence; riding on horseback, or in an uneasy carriage; prolonged dancing; running, or walking too far; lifting heavy weights, and physical exertions of any kind; shocks or concussions of the trunk; falls on the thighs or hips; excitation or irritation of the sexual organs, by injections, pessaries, or suppositories; the more violent mental emotions, as anger, fright, &c. SENNERT refers to a case in which it was induced by a stimulating pessary; and obstruction or retardation of the menses may be the cause of hæmorrhage, independently of any means being used to remove this obstruction, as shown by DESORMEAUX and LOCOCK. It is, also, not unusual for metro-hæmorrhagia to occur within the first fortnight after marriage, especially when this rite has been performed shortly before the period of female indisposition. It has been supposed that sexual congress during this period is apt to induce an attack of this disease. Certain causes, also, may occasion it, by affecting related organs, and thereby acting sympathetically upon the uterus. VAN-DEN-BOSCH adduces instances of it having been produced by worms in the intestines. I have seen it favoured, if not excited, by ascarides. —STOLL and FINCKE observed uterine hæmorrhage unusually prevalent during the bilious inflammatory fever of 1778. GENDRON, CONRADI, STRACK, and HÖPFNER, remarked it occasionally to attend gastric and bilious diseases; and ZIE-

GERT conceived that it is not infrequently induced by irritating matters lodged in the bowels. The irritation of the mammæ during suckling causes it, in some females. A passive and severe form of the disease has been observed to attend upon epidemics of an adynamic or malignant character; and upon scurvy, and some other cachectic maladies.

226. But however influential and numerous may be the occasional causes of metro-hæmorrhagia, they do not so frequently produce it as *morbid formations in the uterus*, particularly fibrous and other tumours seated in the parietes of the organ, or under the internal lining, polypous productions, hydatids, moles, ulcerations, carcinoma, &c. It may also attend inversion, prolapsus, or other displacements of the womb; or may accompany inflammatory congestion of this viscus, or chronic metritis; and it may even prove a critical evacuation in these affections.

227. *B. Symptoms and Progress.*—These vary with the causes of the hæmorrhage. If the occasional cause be violent, it sometimes follows instantly upon the action of such cause; but, more commonly, a certain interval is observed, during which indications of congestion of the uterine vessels may be observed. In some such cases the attack is so severe as to place the patient's life in jeopardy, particularly if it have occurred during the menstrual period. This form, which may be called accidental uterine hæmorrhage, does not ordinarily occur; but that, on the contrary, which follows the operation of the predisposing causes, is slowly established, and often by a successive increase or duration, or by the more frequent return of the menstrual discharge.

228. The precursory symptoms of an attack sometimes consist only of uneasiness, or colicky pains, as on the accession of the menses; but more frequently the discharge is preceded by some of the following signs—by enlargement, tenderness, or pain of the breasts; tension at the hypochondria; a sense of fulness, weight, heat, throbbing, or pain in the hypogastric and inguinal regions; constipation, or tenesmus with occasional abdominal pains; general lassitude, and a frequent, soft or open pulse. To these succeed pallor of the face, coldness of the extremities, horripilations, the *cutis anserina*, and heat or pruritus of the genitals, followed by the sanguineous discharge, which removes most of the foregoing ailments; but, when the loss of blood has become great for her strength, the patient complains of a sense of sinking or weakness at the epigastrium; and when it is excessive, the lips and face are pallid, the pulse fails, and the eyes grow dim; noises are heard in the ears, and deafness supervenes; respiration becomes quick, laborious or irregular; and faintness, full syncope, convulsions, or even death may take place. But the symptoms do not always follow this course. In some cases, the discharge is less rapid or excessive; coagula form in the vagina; and these restrain the hæmorrhage, and are afterwards expelled by voluntary efforts, before the severer symptoms occur. In delicate or nervous females, convulsions or other nervous symptoms may appear early, or before much blood is lost. Violent headach, especially towards the occiput, is a very common attendant, and generally continues long

after the hæmorrhage has ceased. If the discharge, without being excessive and rapid, recurs frequently, or is moderate but continued, or merely remits, the patient complains of pain and sinking at the stomach, of extreme languor and exhaustion; the pallor is extreme, the eyes are surrounded by a livid circle; the ankles become oedematous, especially towards night; various nervous symptoms appear, and serous effusions into the shut cavities occasionally occur. Metro-hæmorrhagia may appear at first in a sthenic or acute form, and become passive or asthenic from its continuance or recurrence; the effused blood being frequently thin, pale, or dark. It may continue long, or return often, without giving rise to any severe ailment, or merely to some of the foregoing symptoms in a slight degree. When it occurs at the menstrual period, it is often replaced by a leucorrhæal discharge.

229. *C. Diagnosis.*—The disease is so manifest as to the extent of the sanguineous discharge, and the effects thereby produced upon the system, that its diagnosis is a matter of no difficulty. But it is not so easy to distinguish between the causes which produce it, and the states of the œconomy which are induced by it. Yet this distinction, as M. DESORMEAUX contends, should be made, as it directs to a judicious method of cure, and it will generally be made without great difficulty if the attention of the practitioner be directed to the subject, and if the various circumstances causing the attack, and the several phenomena attending it, be passed in review. As to uterine hæmorrhages dependent upon organic lesions of the uterus, it may be remarked, that most frequently they are not passive, even when they proceed from ulceration; but that they are generally preceded by circumstances indicating sanguineous congestion, active determination, or an hæmorrhagic effort.

230. iii. Uterine hæmorrhage, *about the period of the cessation of the catamenia, or subsequently to this period*, is not infrequent. Menstruation, then, often assumes an irregular form—disappearing for months, and returning in a profuse or truly hæmorrhagic form. Generally this circumstance is unattended by material risk. But if the discharge be very great, or occurs often, or if it appears after the age of fifty or after the catamenia have ceased for many months, or for two or three years or more, there is sufficient cause for alarm, and serious disease of the uterus should be suspected. Such returns of youth, with which aged females sometimes console themselves, are rarely unattended by some one of the structural changes already enumerated (§ 226.). I was consulted, however, long ago in a case of a female above sixty, and otherwise in good health, who had returns of uterine hæmorrhage at nearly monthly intervals. No disease was detected upon examination; and she is now alive and well, and in her 74th year. I was very recently called to a lady 47 years of age who had been subject to frequent returns of uterine hæmorrhage during two years, and who was labouring under a dysenteric attack when I saw her. This latter was soon subdued, when the hæmorrhage, and the cause of it, became objects of attention. An examination was made, and a hard fibrous tumour was found in the os uteri. It was soon afterwards thrown off; but the hæmorrhage re-

turned and symptomatic irritative fever continued. An examination was made some days afterwards, and another tumour was found passing into the vagina. This, which was distinct from the former in structure and form, came away soon afterwards, and the recovery was progressive and complete. In this case, the tumours were most probably developed beneath the internal lining of the uterus, and thrown off, in the course of the treatment which was adopted for the arrest of the hæmorrhage.

231. The *symptoms* of uterine hæmorrhage at this advanced epoch of life, are not different from those already described (§ 227.). But they are more generally caused by organic lesions of the womb, than uterine hæmorrhage at the preceding epoch, and complicated with the symptoms which more particularly appertain to the associated lesion. Indeed this constitutes the chief malady; the hæmorrhage being only the contingent, but often the more immediately dangerous, or most alarming, occurrence. The consideration, however, of these associated lesions cannot be entered upon at this place. It is fully entertained in the article upon *diseases of the Uterus*.

232. IV. OF PUERPERAL UTERINE HÆMORRHAGE. — Under this head is comprised hæmorrhage *during pregnancy or parturition, and after delivery*. — The changes that then take place in the uterus, and particularly soon after parturition, sufficiently account for the frequency of metro-hæmorrhagia, at these periods. — *During pregnancy* there is an actual increase of the vitality as well as of the bulk of the uterus — a state of orgasm of which vital activity and vascular determination are the chief elements. Hence the active nature of the hæmorrhages that take place from it at this epoch. Besides, this viscus contains an organised and living body, presenting intimate relations with it, and opposing certain of the circumstances which favour sanguineous effusions from it. The vascular connection between the uterus and placenta becoming more developed as pregnancy advances, it follows that the detachment of a portion or the whole of the placenta or ovum will give rise to a more profuse hæmorrhage in the advanced, than in the earlier months of this period; but as soon as the uterus has thrown off its contents, and in proportion as the uterus contracts, the disposition to effusion will become less, until it altogether ceases. Hæmorrhage during pregnancy or after delivery may proceed, either from the numerous minute decidual vessels, which connect the ovum to the internal surface of the uterus, and are necessarily torn when the ovum is either partially or altogether separated, or from the semilunar openings seen in the inner surface of the uterus, when the placenta is removed, or from both sources. The opinions of pathologists are divided on this subject; but as long as the exact offices of these openings are undetermined, no precise inference can be arrived at as to this question. However it may be settled, the treatment to be adopted is unaffected by it, inasmuch as the fact is unquestioned, that it is to the partial or entire detachment of the placenta from the uterus, that uterine hæmorrhage, at an advanced period of pregnancy, is generally to be attributed.

233. Previously to the consideration of true

puerperal uterine hæmorrhage, the disputed topic as to the *source of the loss of blood* occasionally observed in the earlier months of pregnancy may be briefly referred to. This species of discharge has been considered as a true menstrual evacuation from that part of the uterus, to which the ovum has not become particularly attached by means of the placenta, and that it escapes through the imperfectly closed *os uteri*, owing to the softness of the mucous or albuminous secretion which fills it. But if this were the case, we may reasonably infer, that it would also occur in many instances, in which the *os uteri* presents a complete obstacle to its exit, and in which it would accumulate and assume the form of internal hæmorrhage. Having met with two or three instances in which I was enabled to inquire into the phenomena attending this kind of discharge, I am of opinion, that it proceeds from the cervix and *os uteri*, external to the limits to which the deciduous membrane extends; and that it depends upon the active vascular determination, of which the uterus is the seat during the early months of pregnancy. In some cases, this discharge takes place only once, about the usual monthly period, in others oftener; it is generally slight, and of short duration; seldom considerable. It often passes into a somewhat profuse leucorrhœa; and this circumstance indicates that it proceeds from the same seat, and depends upon a nearly similar state of vascular action, as that secretion.

234. *Puerperal uterine hæmorrhage* is somewhat different as to its causes, prognosis, and indications of cure, in the different periods in which it occurs: — 1st. It may appear *before the sixth month of Pregnancy*, and it is then generally active, or dependent upon vascular determination, or a *molimen hæmorrhagicum*; sometimes mechanical, or owing to a local injury or violence, which has occasioned the partial or general separation of the attachments of the fœtus, and connected with *abortion*, the risk of which it announces. — 2d. *During the three or four last months of pregnancy* it may, in some cases, be connected with the same causes, or changes; but it more frequently depends upon the attachment of the placenta upon, or very near to, the mouth of the womb. 3d. It is chiefly to this cause, and to some others about to be noticed, that hæmorrhage takes place *during parturition*; — and, 4th. It is to imperfect contraction of the uterus, that its occurrence *after delivery* is to be attributed.

235. Besides these divisions, there is another to which some attention should be directed. This is into *internal*, and *external*, uterine hæmorrhage. The former often takes place after delivery at the full time, and after abortions; but its occurrence during pregnancy, and whilst the fœtus and its envelopes fill the uterus, has been disputed. M. DESORMEAUX observes that, in internal hæmorrhage during pregnancy, the blood is effused either between the uterus and membranes, or within the membranes. When seated between the ovum and uterus it depends upon the same causes as external hæmorrhage, but certain circumstances have opposed the discharge of the blood. ALBINUS found the placenta detached, and a large quantity of coagulated blood interposed between it and the uterus; its circum-

ference being firmly adherent, and preventing the escape of the blood. BAUDELLOCQUE and DESORMEAUX believe that, in rare instances, the external discharge may be prevented by the head of the foetus pressing upon the neck of the uterus, or by a clot of blood plugging up the os uteri. Hæmorrhage occurring within the membranes is strictly speaking *fœtal*; as the blood in such cases comes from the vessels of the foetus, and generally from a rupture of the umbilical vessels. These forms of internal hæmorrhage (during pregnancy) have been denied by M. DUGES and some others. But the facts adduced by ALBINUS, DE LA MOTTE, LEVRET, and BAUDELLOCQUE indicate, that it actually occurs but in rare instances. M. DESORMEAUX even enumerates the symptoms by which its existence may be recognised. He states that it may be inferred from the presence of the usual symptoms of hæmorrhage without the external discharge; by a sense of weight and of painful tension in the region of the uterus; and by the sensible augmentation of the volume of this organ, generally in an unequal or lobulated form, owing to the effusion occurring exteriorly to the membranes, and being confined to one part. It is obvious, however, that these indications cannot be fully depended upon.

236. *A. Uterine hæmorrhage previous to the sixth month* of pregnancy arises in the manner already stated, from the causes enumerated above (§ 224.), or from means resorted to in order to procure abortion, or from some of the other causes adduced in the article ABORTION. At this period, a certain interval elapses between the action of the cause and the commencement of the discharge, during which, symptoms indicating sanguineous congestion of, or determination to, the uterus are manifested; and when a suitable treatment is then adopted, these symptoms disappear, and hæmorrhage is prevented. The causes of hæmorrhage, during this part of pregnancy, are never more influential than at the usual periods at which the catamenia would have returned if the patient had not been pregnant; and it is during these months, that general or local plethora, and mental emotions, causes so frequently concerned in the production of uterine hæmorrhage, seem to be most injurious.

237. *B. a. Hæmorrhage at, or subsequently to, the sixth month* is generally owing to the attachment of the placenta on the neck of the uterus, and commonly appears without any obvious remote or exciting cause. It is generally moderate at first, and either subsides spontaneously or after treatment. But it soon returns as before, is more abundant, continues longer, and does not yield so soon to treatment. Hæmorrhage from this attachment of the placenta generally goes on increasing until the child is destroyed, or delivery is effected. Yet it occasionally commences with great violence, and instantly threatens the life of the female. Sometimes it does not occur until near the natural period of delivery; or it appears much earlier, and returns not until then. M. DUGES considers that, when the placenta is attached only partially over the neck of the uterus, or laterally, the dilatation of the neck will occasion only a slight or very partial detachment of it, and a moderate hæmorrhage, admitting of being permanently arrested; but that, when it

passes over a great portion of the *cervix* and *os uteri*, the discharge, although moderate at first, will return, with greater violence and frequency, and will at last continue until the uterus is emptied, or until the mother and child perish. And, where the life of the female is preserved, the great loss of blood leaves her in a state of anæmia and exhaustion, attended with severe headaches, sleeplessness, or palpitations, and other sympathetic affections.

238. The period of utero-gestation at which this variety of hæmorrhage takes place, coincides with that at which the relation of the placenta with the *cervix* and *os uteri*, to which it is attached, is disturbed, and which is usually from the sixth to the eighth month. But it may occur early in the fifth, or in the course of the ninth. The discharge appears without any obvious cause; but it sometimes is hastened by some effort or physical shock, and is even occasionally attended by a sensation leading the patient to infer, that something had given way in the uterine region. During labour-pains the discharge of blood is always increased, whilst it is diminished by the contraction of the uterus in other cases; and, as parturition proceeds, the placenta occasionally passes before the foetus, which generally dies if this process is not speedily completed. Upon examining the *os uteri* in this form of hæmorrhage, it is found thicker and softer than usual, and its orifice is occupied either partially or altogether by a soft spongy body, which must not be mistaken for a coagulum of blood. If a coagulum be detected in this situation, it ought not to be disturbed, lest the hæmorrhage be renewed.

239. *b.* But hæmorrhage from the uterus may occur in the latter months of pregnancy, although the placenta is implanted on the upper part of the uterus. This, however, is comparatively rare. The blood may be effused in small quantity, and may be chiefly internal. When it is in considerable quantity, and the placenta is separated to some extent, uterine contractions are exerted, terminating in delivery, or in a renewal of the hæmorrhage, from which the patient may expire. This form of hæmorrhage may occur without any premonitory sign; but it is more frequently preceded by a sense of uneasiness or weight, or of pain in the region of the uterus, and other signs of congestion or of active determination. It is most frequently caused by external injury, fright, and concussions of the trunk.

240. *C. During delivery*, a small or moderate quantity of blood is lost, but is rarely pure, being always accompanied with water and mucus. When true hæmorrhage occurs, it is generally owing to the detachment of the placenta by the unequal contractions of the uterus, or to the situation of the placenta near or upon the *os uteri*. In rarer cases, it proceeds from rupture of the parietes of the womb; or from rupture of the umbilical cord. In cases of plurality of children, hæmorrhage may supervene in the intervals between the delivery of each. It is then chiefly owing to effusion from the part of the uterus where the placenta of the first child is inserted, owing to a partial or complete detachment of it. When flooding occurs in the first stage of labour, the discharge always ceases when

the uterus contracts, and returns during the intervals between the pains.

241. *D. Hæmorrhage after Delivery.* — This may occur previously to the expulsion of the placenta or subsequently. *a.* When it takes place *before the placenta is thrown off*, it is usually owing to one or other of the following circumstances, or at least it is met with in connection with them. 1st. To torpor of the organ; — 2d. To a partial detachment of one part of the placenta and undue adhesion of another; — 3d. To irregular or spasmodic contraction of the womb. It scarcely ever proceeds from the chord, unless in cases of twins, when it may possibly take place. But it may arise from laceration of the uterus or vagina. — *b.* *After the expulsion of the placenta*, flooding generally proceeds from imperfect contraction, or torpor, of the womb. It may, however, be connected with inversion, or with retention of a portion of the placenta, or of the membranes, in the cavity or mouth of the organ; and in a few cases it appears to depend upon active determination of blood to the uterine vessels, as insisted upon by Gooch, after some Continental writers. These states of the uterus, especially flaccidity, may be readily inferred from a careful examination and observation of the symptoms. Whether the hæmorrhage takes place before or after the expulsion of the placenta, it may be either *internal* or *external*.

242. *c. Internal uterine hæmorrhage*, after delivery, may thus take place before the expulsion of the placenta or afterwards, or it may be favoured by the retention of the placenta or of the membranes, or of both, partly in the neck and mouth of the womb, and partly in the vagina. That this form of hæmorrhage should be early detected and remedied, is of the utmost importance. The uterus upon external examination will be found soft, roundish, and increasing in bulk, so as often to approach, or even to pass, the umbilicus. It may even ultimately attain the dimensions it had just possessed, and be followed by the death of the female, or by a prolonged and difficult recovery. Whenever pallor of the countenance and lips, vertigo or swimings, noises in the ears, a sense of sinking, nausea, or retching; a very rapid and irregular pulse, a quick anxious or gasping respiration; restlessness, jactitation, &c. supervene, whilst the lochia are not more than usually abundant, or are diminished, internal hæmorrhage to a most dangerous extent may be inferred; and a careful examination of the abdomen ought to be made. In order to ascertain the cause of the retention of the effused blood, the expulsion of all the placenta and membranes should be proved; as well as the presence or absence of a portion of these, or of coagula, in the os uteri and vagina. At the same time, distension of the uterus by effused blood must not be confounded with the existence of another child in the womb, or with meteorismus, or with a distended urinary bladder, either of which cannot be mistaken if attention be directed to it, and to the existence of the symptoms just enumerated.

243. *d. External flooding* after delivery of both the foetus and placenta is not to be mistaken, if due attention be paid the patient; for the blood may collect and coagulate in the centre of the bed, in the depression produced by her

weight, and be overlooked, if she be exhausted and carelessly attended. This variety of hæmorrhage occurs in every degree of severity, and is either gradual, draining, and continued; or rapid, violent, alarming and even speedily fatal; or remittent, intermittent, &c. It is accompanied with all the symptoms already noticed in connection with this (§ 228.), and other severe forms of hæmorrhage, and is followed by most of the phenomena caused by extreme losses of BLOOD, as described in that *Article* (§ 53. *et seq.*). Whilst *internal* or *concealed* hæmorrhage is almost uniformly dependent upon a total want of uterine action, the *external* form arises either from that state, or from imperfect, irregular, or transient contractions, and from either of these states in connection with vascular determination to the womb. When slight, continued or draining, it may be kept up by the retention of a portion of the placenta or membranes, or of fibrinous coagula, in the uterus. It is important to keep in recollection these pathological states, as upon them the appropriate use of remedies entirely depends.

244. *ii. PROGNOSIS.* — The circumstances which indicate a favourable or unfavourable result in other hæmorrhages, also apply to the different forms of uterine hæmorrhage. But the condition of the uterus, in both the unimpregnated and puerperal states, and the period of gestation, with various other related circumstances, must be considered in reference to particular cases. *A. In uterine hæmorrhage occurring independently of the puerperal states*, the prognosis should entirely depend upon the nature of the causes, the states of the uterus, the severity of the symptoms, the duration of the disease, and the strength of the patient. When it is induced by occasional causes of a passing or accidental nature, danger will arise only from the quantity of the discharge. If it proceed from causes which have modified the constitution, and endowed it with a tendency to hæmorrhage, or occasioned an habitual discharge, the treatment will generally prove difficult or unsatisfactory. That variety, which occurs in girls at the periods of puberty, ceases spontaneously as the menses become regular; and that which takes place at the critical age of woman, also disappears with the monthly indispositions, if the womb be free from organic changes. When it proceeds from these changes, the prognosis should be guarded, even when circumstances admit of it not being unfavourable. In these cases danger may arise from the hæmorrhage, as well as from the nature of the lesion of the uterus; but more frequently this latter is the chief source of risk, unless where the morbid formation admits of removal, as in the case of *polypus uteri*. (See art. UTERUS.)

245. *B. Uterine hæmorrhage during the puerperal states* is often one of the most alarming and speedily fatal of the maladies peculiar to females. According to Puzos, it is rarely fatal before the fifth month of gestation. Experience has shown the justice of the remark; yet I have seen life in imminent peril at this early period. Flooding is the more dangerous the nearer it occurs to the natural period of delivery, whether previously or subsequently to this process. As respects the foetus, however, the chances of its preservation diminish with the length of the time to the period

of birth.—Hæmorrhage from insertion of the placenta on the neck or mouth of the womb, is always attended by danger, varying with the violence of the discharge, and requires the speedy acceleration of parturition to save either the mother or child. *Internal*, is much more unfavourable than *external*, hæmorrhage. The latter, when slight, is often its own cure, by removing plethora, or vascular determination. But the former has frequently proceeded to a dangerous or even fatal extent, before the medical attendant is made aware of its accession. Moreover, in order to arrest it, the uterus must be emptied of its contents; and this often increases the exhaustion, or causes a further loss of blood. In either internal or external hæmorrhage, when the pulse becomes very frequent (above 120), small, thready, or irregular; the breathing suspirious or gasping; the motions convulsive, with shuddering, or jactitation; or the sinking and anxiety distressing; and if full syncope supervene, notwithstanding the supine posture and low position of the head, great danger exists, and the patient may either suddenly expire, or recover slowly and with great difficulty.

246. iii. TREATMENT.—A. Hæmorrhage from the uterus *previously to puberty* seldom requires more than moral treatment. — B. When it occurs *at or after puberty, independently of the puerperal states* — 1st, The occasional causes should be avoided; — 2d, Means appropriate to the pathological states producing it, ought to be used for its arrest chiefly when it is excessive; — and, 3d, Measures should be directed to prevent its return when the nature of the case indicates that a return is probable. The fulfilment of the *first* intention will often accomplish the *third*, and will generally promote more or less the success of the *second*. — a. In a great majority of instances, the hæmorrhage is the result of active determination or of congestion; and it is often connected with a chronic or slight grade of inflammatory action. In these circumstances, the discharge ought not to be arrested by astringents or tonics; for I have seen this kind of interference convert a slight and salutary hæmorrhage into a severe or chronic inflammation. Yet it is not always judicious to allow the discharge to continue, inasmuch as the uterus might thereby contract a disposition to hæmorrhage, or to some other disease. It will be better to attack at once the pathological conditions—general or local plethora, or local vascular excitement—upon which the disease depends, by general or local depletions, by internal refrigerants, by a strictly antiphlogistic diet and regimen, and by repose of mind and body. The patient should be placed in a cool and airy apartment, and preserve the horizontal posture on a bed or couch which is neither too soft, nor too warm. The nitrate of potash, vegetable acids, and acidulous fruits should be given from time to time; and the circulation may be equalised by cooling diaphoretics, as ipecacuanha, hyoscyamus, and nitre, with small doses of camphor. Ipecacuanha, in free or frequent doses, is one of the best remedies that can be prescribed; and when bilious colluvies require to be removed, it may be given so as to procure full vomiting, as advised by STOLL, FINKE and others. Constipation ought always to be prevented; but heating and irritating cathartics ought to be withheld.

The tartrate of potash, or of potash and soda; tamarinds, or the supertartrate of potash with the confection of senna, the inspissated juice of the sambucus, &c., or any of the aperient electuaries in the *Appendix* (F. 82.96.98.), and mild laxative enemata are the most appropriate. *Derivatives*, as warm manuluvia, are occasionally of use, and are advised by HOFFMANN and LORDAT. DUGES and some French practitioners direct the application of cupping glasses on the mammæ. When bloodletting has been employed, or is not indicated, *dry cupping* over the loins or sacrum may be resorted to. *Opium* and other narcotics are most beneficial in the form of DOVER's powder. It is only in the more urgent cases, that cold either externally, or in lavements, and other means about to be recommended, need be prescribed.

247. b. If the hæmorrhage has passed into a *chronic*, or into a *passive* state, the foregoing treatment is no longer appropriate. Tonics and astringents are then required; especially the preparations of catechu, or those conjoined with opium as directed by WENDELSTATT; the muriated tincture of iron; the terebinthines and balsams; the superacetate of lead and opium; the sulphate of alumina or the metallic sulphates; and the other astringents already recommended for other asthenic or profuse hæmorrhages (§ 40–45). It is in the passive form of the disease that the *secale cornutum* seems to be most serviceable. It may be given in decoction or powder. DR WEDEKIND and SAUTER advise the exhibition of the *Juniperus Sabina*, in doses of from ten to twenty grains of the powder, thrice daily, but it should be exhibited with caution, and its effects attentively watched.

248. c. In *delicate or nervous females*, in whom metro-hæmorrhage soon assumes a passive character, and gives rise to various nervous affections, an early recourse to restoratives, astringents, and sedatives, is often necessary. *Camphor*, with nitrate of potash and opium or hyoscyamus, in conserve of roses; DOVER's powder with catechu; the infusion of roses with sulphuric acid and anodynes; the balsam of Peru or of Tolu, in the form of pills, with magnesia, or powdered rhubarb, or with oxide of zinc, and small doses of opium, according to the peculiarities of the case, may be severally employed.

249. d. If the hæmorrhage continue, or become excessive, or occasion exhaustion, or any alarming symptom, the use of cold externally and internally has been very generally recommended. HOFFMANN and LEAKE advise cold fluids to be taken in large quantity; PEZOLD, very cold clysters, and the external application of pounded ice to the hypogastrium; numerous writers, various cold epithems, on the loins, tops of the thighs, vulva, &c.: and many recent authors, the cold affusion on these situations. But these require much discrimination. They are not always appropriate in the passive states of the disease, and they are serviceable chiefly when the active form has become excessive or dangerous. Yet I have seen recourse to them fail, in some instances, and productive of injury, in others. If resorted to prematurely, they may be followed by inflammatory action in the uterus, peritoneum, &c., or by severe rheumatic attacks.

I have, therefore, had recourse, in extreme or prolonged cases, to the spirits of turpentine, either in a draught, or in an enema, or in the form of epithem or fomentation applied over the hypogastrium; and always with success. — This practice was first adopted by me in 1819, in metro-hæmorrhagia occurring after delivery, and has been pursued by me in other hæmorrhages, whenever it was considered advisable speedily to arrest them. In 1820, I publicly recommended this treatment; and I know, that it has succeeded with those who were thus led to employ it.

250. *e.* When the hæmorrhage is *symptomatic of organic disease of the uterus*, it is generally prolonged, or returns frequently, and is injurious more from this circumstance, than from its violence at any particular time. It is also often remittent, or periodic, the intervals varying in different cases; but the discharge generally subsides spontaneously after local plethora or determination is removed, and returns again as soon as the organic change has established vascular fluxion, or congestion in the uterine organs. Although merely a symptom of the existing organic lesion; yet its frequent recurrence, and the consequent anæmia, sinking, and serious nervous symptoms, require that it should receive the chief attention in the treatment; — and that tonics, astringents, restoratives and anodynes, should be liberally, but appropriately, exhibited. When the hæmorrhage is symptomatic of ulceration, or of malignant disease, injections, *per vaginam*, with the solutions of the *chlorides*, particularly of the chloride of lime, or with pyroligneous vinegar, or with solutions of *kréosote* should be resorted to, in addition to the means just mentioned. When it is occasioned by a polypus, or by a tumour on which a ligature may be placed, then this ought to be applied.

251. The *third intention*, viz., to prevent the return of metro-hæmorrhagia, need hardly be enforced in the accidental form of the disease; but it is of the first importance in the constitutional, habitual, or periodic states. In order to fulfil it, the remote causes ought to be removed or avoided; and the patient be placed upon a strict diet and regimen. Every source of local and of general and mental irritation should be shunned. The horizontal posture ought to be retained as long as possible for some time previously to, and during, the discharge; and, in the intervals only, gentle exercise should be taken in the open air. The food ought to consist chiefly of mucilaginous and farinaceous articles, of easy digestion; and asses' milk, with Seltzer water, as advised by HOFFMANN may be used both as a beverage, and as an article of diet. The patient should be kept cool; she ought to sleep on a mattress, rise early, or remove to a couch: and, if she be married, lie apart from her husband. If the hæmorrhage be active and dependent chiefly upon general or local plethora, a small bloodletting from the arm may be resorted to just before the expected accession of the hæmorrhage; or small and frequent doses of ipecacuanha, so as to occasion either nausea or vomiting, may be tried as directed by HOFFMANN, RANOE, HOLST, DALBERG, and others. — In cases depending chiefly upon debility, the preparations of cinchona, of iron, or of other tonics; the cold plunge

or shower bath and salt-water bath; the mineral waters of Tunbridge or of Bath; the factitious waters of Pyrmont, Spa, or of Seltzer, and a light diet; will be of great service. When the recurrence of the discharge is owing to organic lesion, cold bathing is inappropriate, and the mineral waters just mentioned require to be tried with circumspection. Those of Ems of Carlsbad, or of Marienbad, however, will often be employed with benefit.

252. *C. Treatment of puerperal metro-hæmorrhagia.* — *a.* Previously to the sixth month, uterine hæmorrhage should be treated altogether as described in the article ABORTION. If the fœtus and membranes have entirely come away, and the discharge continue from a passive state of the uterus, the exhibition of spirit of turpentine in an enema, will rarely fail of arresting it; but the practitioner should ascertain that no part of the placenta or membranes remain in the uterus or vagina, causing irritation and prolonging the discharge. When the uterus is thus inactive, after abortions, the *secale cornutum* or *borax*, or the spirits of turpentine may likewise be exhibited to procure its contraction.

253. DESORMEAUX considers that hæmorrhage may take place in the early months of pregnancy, so as partially to detach the placenta, but that the clot that is formed between it and the uterus will often arrest the hæmorrhage and adhesion of the detached portion subsequently occur; and he refers to a case by NOORTHWYK, in support of his opinion. On this ground he advises having recourse, at the earlier periods of gestation, to *plugging* the vagina, as recommended by LEROUX, after bleeding and the usual means of arresting the hæmorrhage have failed. (See ABORTION, § 26. et seq.) At these periods, the uterus is still more or less unyielding, and the resistance to further effusion is considerable. But, in slight attacks, or at the commencement, the obstacle afforded by the plug may hasten the complete detachment of the ovum, by favouring the accumulation of blood between it and the uterus; and either a copious internal hæmorrhage may thereby be produced, or the ovum, being detached, may be prevented by it from being thrown off, and be retained for a long period, keeping up irritation and hæmorrhage, or a continued draining with occasional exacerbations, or a putrid discharge. Indeed, this occurrence is not rare in the early months, independently of the plug, although the use of it before the expulsion of the ovum, and when the os uteri is soft or yielding, is more likely to occasion than to prevent it. When, however, the os uteri is firm, and the discharge copious, it is often of service; but it is chiefly after the ovum is expelled, in cases of flooding before the fifth month, that plugging is most efficacious, if efficiently employed. Care should be taken that the plug do not press injuriously upon the urethra: Mr. INGLEBY directs that it should remain undisturbed for twenty-four hours or longer; but the superintention of internal hæmorrhage should be kept in view, and the case carefully watched.

254. When the blood escapes in small quantity only, and there are no pains present, and no disposition in the os uteri to dilate, the constitutional powers being unimpaired, an attempt should be made to prevent a return of the dis-

charge, by the means already described both in this article and in that on ABORTION. But, as Dr. R. LEE justly remarks, where the flooding is profuse at first, or is renewed with violence, in spite of efforts to check it, the continuance of pregnancy to the full period cannot be expected, and it will be of no avail to take blood from the arm, and to administer internal remedies with any other view than with that of arresting the discharge, and thereby averting danger. In these circumstances the speedy evacuation of the uterus is the chief indication, as the slightest cause may reproduce the hæmorrhage, in an alarming manner, whilst the partially detached ovum remains. But, in the early months of pregnancy, this intention is not so easily accomplished, as at later periods. *Puncturing* the membranes in order to excite the uterus is advised by RIGBY, R. LEE, and MERRIMAN; but, before the fifth or sixth month, this may not be easily performed; and, until the sixth or seventh, the hand, however small it may be, will not readily be admitted into the uterus. The *ergot of rye* has been recommended by NEALE, NEGRI, RYAN, and numerous American as well as European practitioners, in order to procure the contraction of the womb in such cases. It may be given in powder, or in decoction, with three or four drops of the oleum Pulegii, as advised by Dr. RYAN. I have prescribed it successfully both alone and with from ten to twenty grains of the sub-borate of soda. An enema, containing an ounce or an ounce and a half of spirit of turpentine may be thrown up, if these fail. A judicious recourse to these means will generally supersede the use of the plug or puncturing the membranes, the propriety of which latter before the sixth month is denied by Mr. INGLEBY and some others. Wherever, in such cases, the end can be obtained by the use of medicine, recourse to any operation, however trifling, should be avoided. Instances, however, may occur about the fifth or sixth month, in which perforating the membranes is required, in addition to the other means just advised. The cold affusion or the dashing of a wet napkin against the external parts, or the application of the turpentine epithem on the hypogastrium, may be also resorted to, when the case becomes urgent.

255. *b.* When in the *third or fourth months*, the hæmorrhage is continued, draining or remittent, a merely partial evacuation of the uterus should be suspected, more especially if the discharge become offensive; or, if the fœtus with the whole of the appendages have been ascertained to have come away, a flaccid or relaxed state of the uterus may be inferred. In such cases, a careful examination will discover one or other of these states, which will generally be removed by the medical means just advised, and especially by the exhibition of the spirit of turpentine by the mouth, or in enemata. The recommendation of Drs. HAIGHTON and BLUNDELL to inject the uterus with astringent fluids, if at all advisable, is most likely to be serviceable in cases where a portion of the ovum has been retained in the uterus, and is passing into decomposition.

256. *c.* *Hæmorrhage after the sixth month*, although occurring most frequently from attachment of the placenta upon the *cervix uteri*, may also take place when this does not exist. In this

stage of pregnancy, as well as at earlier periods, if the discharge be in small quantity or moderate—if it have not proceeded with much rapidity—if it stop soon—if no large clots be formed in the vagina—if the cervix have its usual feel, showing that the placenta is not attached there, and that no large coagula are retained in the os uteri—if the child be still alive—if there be no indication of the accession of labour—and if the discharge become pale and watery—we may conclude, with Dr. BURNS, that the full period of gestation may be reached. In this case, the treatment already directed in active hæmorrhage ought to be adopted. But where the effusion is profuse, or continues, and the strength of the patient is impaired by it, the fœtal membranes should be punctured, the liquor amnii evacuated, and the uterus roused to action by the means just advised (§ 254.), aided by frictions over the hypogastrium, and by dilation of the os and cervix uteri.

257. *d.* When the placenta is attached over the *cervix uteri*, as evinced, on a careful examination, by its fibrous vascular structure; by its adhering to one part of the uterus, and being separated at another; by the renewal of the hæmorrhage during labour pains; and by its occurrence without any obvious exciting cause, the utmost decision and dexterity on the part of the practitioner is required. If flooding occur to an alarming extent in the seventh or eighth months, an examination should be instantly made, and while the blood is actually flowing. In some cases, where a small portion of the placenta lies over the os uteri, coagula may close the orifices of the bleeding vessels, and the patient may go on to the full time. In these, the hæmorrhage is seldom very profuse; and this result cannot be expected. The general recurrence and increased violence of the effusion, until the patient either expires, or is delivered by art, demand that a rule of practice should be laid down; and the rule first devised by LEVRET, and now generally received, is the *speedy performance of artificial delivery*. Dr. R. LEE states that he has seen only one case of flooding from the position of the placenta, followed by recovery, without artificial delivery; and, in order to accomplish this, he recommends the hand to be passed into the vagina, as in turning, without waiting for the pains of labour, or the dilatation of the os uteri, and carried steadily forward through the os, in a conical form, between the uterus and placenta, at the part where their separation has taken place. The membranes are then to be ruptured, and an inferior extremity of the child brought down, and the infant and placenta slowly extracted. The hand, however, should not be forcibly introduced whilst the os uteri is rigid and undilatable. Until it becomes soft, the flow of blood should be checked by the recumbent posture, by cold applications and the *plug*. But this latter ought not to be inserted when the os uteri is soft and dilatable. In the rigid state of this part, in hæmorrhage from this cause, it will command the effusion, until the operation of turning can be safely performed; but, as soon as this may be attempted, it becomes inadmissible.

258. *e.* If flooding occur during the *first stage of labour*, at the full time, the membranes should be immediately ruptured, as recommended by CLEMENT, PÜZOS, KOK, RIGBY, BAUDE-

LOCQUE, DENMAN, MERRIMAN, D. DAVIS, BLUNDELL, LEE, RAMSBOTHAM, SWEATMAN, and others; but if the discharge should still continue, and the pains become more and more feeble, and the patient exhausted, delivery must be accomplished by turning, by the forceps, or even by embryotomy, according to the circumstances of the case. In less imminent cases, the ergot of rye and other means already mentioned (§ 254.) may be tried before recourse be had to these operations. Mr. INGLEBY, however, considers that many of this description of cases are occasioned by the injudicious use of the ergot; but, when it is employed for the arrest of the discharge, and for the purpose of procuring uterine action, this objection does not apply either to it, or to other means intended to exert a similar operation. After the liquor amnii has escaped, the os uteri still remaining rigid, there are objections to the exhibition of the ergot: and in such a case, plugging the vagina, as advised by BURNS, DEWEES, CAPURON, GARDIEN, DAVIS, &c., may be resorted to, with the aid of friction and moderate pressure on the abdomen in order to increase uterine action. The possible occurrence, however, of internal hæmorrhage should not be overlooked; and if this take place, the still more active interference just mentioned must not be delayed. But the plug should not supersede rupturing the membranes when flooding occurs at the commencement of labour at the full time.

259. *f. Hæmorrhage after the birth of the fetus*, and before the expulsion of the placenta, is frequent and often sudden and profuse. In this case, strong pressure should be made over the hypogastrium in order to excite uterine action. A binder ought to be firmly applied over the abdomen, several folded napkins being placed under it, so that the fundus uteri be compressed. Dr. R. LEE advises the hand afterwards to be introduced to remove the placenta, but the removal of it should not be attempted until contraction of the uterus commences. After contraction, and the expulsion or withdrawal of the placenta, he directs a cloth wet with cold vinegar and water to be applied to the external parts, cold acidulated drinks to be given from time to time, and the patient to be preserved for two or three hours in a state of perfect repose. This plan will generally succeed when the hæmorrhage and retention of the placenta are caused by inactivity of the uterus. But when irregular action of the organ, or spasmodic contraction of the *os internum* or *externum uteri*, retains the placenta either altogether or partially, and thus causes *internal* hæmorrhage, additional means, especially the exhibition of opium by the mouth, are required. The passage of the hand, in order to remove the placenta, then demands caution and perseverance. If it cannot be accomplished, the turpentine enema, or embrocation, will generally aid in removing the difficulty. If the flooding arise from morbid adhesion of a portion of the placenta, the adhesion must be separated by the hand, in a manner that will readily suggest itself. Dr. T. RAMSBOTHAM attributes these adhesions to partial separation of the placenta during pregnancy, from some accidental cause, followed by a slight discharge, the extravasated blood exciting inflammation of the separated surfaces

with effusion of lymph, and consequent agglutination of them. This opinion is probably correct.

260. *g. Flooding after the expulsion of the placenta* requires a modified practice according as it arises.—1st. From atony of the uterus;—2d. From imperfect or remitting contractions;—3d. From a portion of the placenta left in the uterus;—and, 4th. From inversion of the organ. As in hæmorrhage previously to the complete expulsion of the placenta, so in this the blood may be retained in the cavity of the viscus, by coagula, or by a portion of the secundines lodged in the os uteri or vagina. In every case, therefore, the state of the uterus and the integrity of the placenta should be ascertained.—Where simple atony of the uterus is the chief cause, constant and well directed pressure on the fundus uteri, especially by the hand, the sudden application of cold, or effusion of cold water; the turpentine enema, or draught; the ergot, &c.; are the most efficacious means. If the hæmorrhage be internal, from any of the causes just stated, the same measures will generally procure their removal, by contracting the uterus; but if these fail, they should be removed by the hand. The draining or recurring hæmorrhage, the expulsion of clots, the offensive nature of the discharge, and the constitutional effects consequent upon the presence of a portion of the placenta in the uterus, demand at first the same means as other states of the disease; but afterwards, and particularly when serious constitutional symptoms supervene, indicating a remarkable diminution, and marked vitiation, of the vital current, additional or other remedies should be employed. Weak solutions of the chloride of lime, or of soda, should then be injected *per vaginam*, or even into the uterus; and the decoction of cinchona with the chlorate of potash, or with muriatic acid; camphor in frequent doses; an occasional enema with spirits of turpentine, or draught with the same and castor oil; the sub-borate of soda, and other means calculated to support the vital energies, to increase the excreting functions, and to enable the uterus to contract and discharge the matters retained in it, should be prescribed.

261. The occurrence of hæmorrhage after delivery, whilst the uterus appears to be contracted, upon which Dr. GOOCH has so unnecessarily insisted, is nothing more than its connection with an imperfect, remitting, or irregular contraction, in some cases, and with determination of blood in others; states previously known to the profession, and requiring, at most, but a modification only of the means insisted upon in the course of this article. In these, as well as in other cases, the application of pounded ice has been much praised; but the continued application of great cold is less beneficial than the shock produced by the affusion of moderately cold water, or by dashing a wet napkin upon the hypogastrium and external parts. Indeed the former may cause an imperfect or irregular contraction to pass into a state of relaxation, and thereby perpetuate the hæmorrhage. With respect to the hour-glass contraction of the uterus, insisted upon by Dr. BURNS and others, in connection with flooding, the perspicacious remarks of Dr. MALINS should be borne in mind. This acute physician observes that, as the contraction

of the uterus in the unimpregnated state, dividing it into two portions, disappears under gestation, the whole uterus then forming but one spheroidal cavity, so the removal of the distending causes allows the organ to recover, in a great degree, its original shape during contraction, and that thus two cavities again exist in some measure, divided by that contraction usually denominated the os internum uteri, perfectly natural indeed in character, but to which the name of hour-glass contraction as denoting a preternatural state, has been in error so constantly applied. The contraction of the circular fibres, which thus takes place, dividing the upper part of the genital canal into two chambers, when excessive, the other portions of the organs being relaxed, is not infrequently associated with hæmorrhage either whilst the placenta is still retained in the upper chamber, or after it has been thrown off, coagula filling the lower cavity, formed by the cervix uteri. The introduction of the hand into the uterus in order to excite it to action, or to press upon the part to which the placenta was attached as advised by Dr. Gooch and others, can seldom under judicious management, be necessary; and it is very doubtful if it will ever prove serviceable. Plugging the vagina, after delivery at the full time, requires the utmost caution and constant watching, even when the uterus is firmly contracting, as it may favour dangerous internal effusion.

262. *D.* The management of a patient after dangerous uterine hæmorrhage constitutes an important part of the treatment. Although the uterus is firmly contracted, and the patient seems comfortable, yet she ought not to be considered as altogether safe, as the uterus may again relax and the hæmorrhage return. This contingency ought to be guarded against by applying a proper binder, by perfect repose, and by a full dose of opium, if irritability or restlessness exist. Her position ought not to be changed for several hours, and the horizontal posture must not be departed from on any occasion. The room should be darkened and well ventilated, and nutrient but light fluids, in moderate quantity, should be given at stated intervals.

263. *iv.* THE PARTICULAR REMEDIAL MEASURES ADVISED BY AUTHORS FOR UTERINE HÆMORRHAGES require but little notice, after the full exposition of the treatment given above. — *a.* *Vascular depletions*, either general or local, are directed by several writers, and particularly by SCHENCK, LEFEVRE, and PELARGUS; but they are admissible only in the more active states, and as means of prevention, especially in these. When practised so as to derive from the seat of hæmorrhage, some advantage may accrue from *local depletions*, more especially from cupping over the sacrum or under the mammæ, as advised by HIPPOCRATES and ACTUARIUS. Several of the ancients resorted to cupping on the breasts; GALEN directed this operation to be performed over the hypochondria; and GONDRET prescribed *dry cupping* with large glasses, between the shoulders. *Emetics* have been prescribed in order to derive the circulation from the uterus, after bloodletting has been resorted to, by STOLL, GENDRON, REIDLIN, and KORTOM. CONRADI employed them to procure contraction of the uterus, and the expulsion of coagula in uterine hæmorrhage after delivery. They are

certainly serviceable in some cases, but they require discrimination, and their effects ought to be carefully observed.

264. *b.* *Internal refrigerants*, particularly nitre and cold drinks, have been praised by several of the older writers. MM. MARTINET and DESLANDES have recently given the *nitrate of potash* in remarkably large doses — as much as six drachms in the twenty-four hours. It is not appropriate in cases of puerperal hæmorrhage, although it is sometimes of service in the active forms of the disease unconnected with pregnancy. I have given it in hæmorrhage after abortion, but with little or no benefit. The *muriate of ammonia* is more likely to be serviceable, especially in cases of debility, and when the discharge is draining or remittent. It may then be given with cinchona, or small doses of opium.

265. *c.* Of the application of *cold*, little further need be stated. It has been generally prescribed by writers from HIPPOCRATES to the present time. COLLOMB, DOEMLING, GAUTHIER, HIENSIUS, CHAUSSIER, and most modern authors, recommend it both internally and externally, in the forms of epithem and injection. RANOE, LOEFLER, JOSEPHI, D. D. DAVIS, and OLIVIER, direct cold drinks; whilst FIELIZ and THOMANN consider cold in any form inappropriate in uterine hæmorrhage after delivery, and in the passive states of the disease. There is much justice in this. The recourse to cold requires great discrimination; for, if too long applied, or if the cold be too great, much mischief may be produced by it. The sudden and temporary application of cold, so as to produce more or less shock to the frame, is certainly more beneficial, and more generally appropriate, than a prolonged recourse to it.

266. *d.* *Astringents* have been very generally administered both by the mouth, and *per vaginam*, in metro-hæmorrhagia. *Aluminated whey* has been prescribed by LENTIN, PASTA, MÜLLER, LINDT, STROEM, and HUFELAND. THILENIUS has directed it to be employed topically, by means of a sponge. WENDT and AASKOW have recommended the *sulphuric acid* with laudanum; GEBEL the tincture of *muriated iron*; and FOTHERGILL, CARRON, and WENDELSTATT, the preparations of *kino*, or of *catechu*. These medicines are even now in general use, but are most beneficial in the more passive states of the disease, unconnected with pregnancy or childbirth, and when the discharge is moderate and prolonged. Of the numerous astringents mentioned by writers, the *superacetate of lead*, in doses of two grains to six or seven, repeated according to the urgency of the case, has been most praised by modern authors, and especially by REYNOLDS, HEBERDEN, MITCHELL, YOUNG, WILLIAMSON, AMELUNG, THOMSON, &c. When the flooding is profuse, or occurs in connection with childbirth or abortion, only the most energetic astringents and the most rapid in their effects ought then to be given internally; and of these, the *spirits of turpentine*; the *ergot of rye* (SPAJRANI, CABINI, &c., in *Ann. Univers. di Med.*, 1830); and the *superacetate of lead*, in large doses, with opium in *acetic* or *pyroligneous acid*, are most deserving of notice.

267. *e.* The more *energetic tonics*, in large doses, have likewise been directed. They are appropriate in cases of debility, when the discharge is

prolonged without being excessive ; and when it is unconnected with pregnancy or active determination to the uterus. In these circumstances, and when the disease is periodic, the preparations of *cinchona* have been prescribed by STROËM, STARKE, DUNCAN, BANG, PICQUE, &c. ; the tincture of *cinnamon* by PLENCK, VOGEL, and SCHNEIDER ; and the *sulphate of iron*, and other chalybeates, by RATH, THILENIUS, and DOEMLING. The *sulphate of quinine* with sulphuric acid and tincture of cinnamon, or with sulphate of iron in the form of pill, will be given with advantage in many cases of this description.

268. *f. Ipecacuanha* in small doses has been much used by PAULISKY, DE MEZA, BRUCK, HOLST, LOEFFLER, STOLL, DALBERG, DENMAN, and others ; and small quantities of *tartar emetic* have been recommended by CHALMERS. The former of these may be useful when the uterus contracts irregularly, and when the placenta is retained from this cause. But it is chiefly in combination with opium, or in frequently repeated doses, that any advantage can be expected from it. In hæmorrhage after delivery, but little benefit will be derived from *opium*, especially if given in large quantity, or depended upon chiefly. When thus exhibited it will rather impair than promote the contractions of the uterus. Yet circumstances will sometimes arise to justify the praises of opium expressed by HORSTIUS, HEISTER, YOUNG, SMELLIE, RANOE, CHESNEAU, and GARTHSHORE, especially in uterine hæmorrhage unconnected with pregnancy, or in that occurring in the earlier months of gestation. In these cases it may be given with dilute sulphuric acid (AASKOW) ; or in *clysters*, as directed by Mr. COPLAND. HARCKE advised it to be used in injections thrown into the vagina — a method by no means to be advocated : and every practitioner of experience will be aware of the danger of administering opium, unless in very small quantity, in the form of enema.

269. *g.* In *passive metro-hæmorrhagia*, particularly when the powers of life are depressed or exhausted, *brandy* or other spirits have been resorted to by many practitioners, often in large quantity. Stimulants of this description are apt to give rise to a very serious affection of the head, and to protract convalescence. *Ammonia*, or *camphor* (ETTMÜLLER), is less objectionable in such circumstances ; and a judicious recourse to spirits of *turpentine*, as advised above, is much more efficacious, and less hazardous. — Of other internal medicines recommended by writers, no further notice than the simple enumeration of them need be taken. The *fungus militensis* has been mentioned by LINNÆUS ; the *bursa pastoris*, by DE MEZA ; the *geum urbanum*, by STROËM ; the decoction of the fruit of the *hippocastanus*, by HUFELAND ; *tannin*, by CAVALIER ; *savine*, by RAVE, FIEST, and WEDEKIND ; *purgatives*, by LENTIN, STRACK, and CONRADI ; and the *pimpinella*, by RIEDLIN. Whatever effects these may produce in the hæmorrhages occurring independently of pregnancy, but little benefit can be expected from them in those supervening during the puerperal states.

270. *h.* Various *external means* of arresting flooding after delivery have been adopted, and frequently with success. *Friction of the abdomen*, particularly when the uterus contracts either

imperfectly or irregularly, and *compression* over the fundus of the organ by the hand, or by *compresses*, *bandages*, &c., have been very properly insisted upon by LEVRET, TALLONY, ZELLER, VOGEL, SMELLIE, OSIANDER, INGLEBY, RAMSBOTHAM, R. LEE, and by most modern writers. LOEFLE directed that pressure should be made by means of a sand-bag. Dr. D. DAVIS and Dr. BEATTY have recommended *bandages* constructed on purpose. Pressure on the descending aorta, through the abdominal parietes, has been favourably mentioned by LATOUR and INGLEBY. PLOUCQUET advised the pressure to be made by the hand introduced into the relaxed uterus ; and EICHELBERGER has adduced an instance of the success of this method. *Injections* of various kinds into the uterus have been employed. PROSPER ALPINUS, THILENIUS, and PASTA prescribed the mineral acids much diluted ; GALEN, the juice of the plantago ; ASTRUC, diluted vinegar ; and KOK, astringent infusions, in this way. FIELIZ directs the hand wet with vinegar ; WENDELSTATT, lint moistened with much-diluted sulphuric acid ; and M. GORAT, a decorticated or divided lemon, to be passed into the uterus.

271. *i.* *Plugs* or *tampons*, moistened with various astringent fluids, have been very generally resorted to since the praises bestowed on them by A. PAREY, HOFFMANN, LEROUX, THILENIUS, TRIOËN, HELD, LOEFFLER, HUMBERG, and SMELLIE. Some modern British authors have, however, supposed, that the addition of astringents is unnecessary, although they approve of the plug in nearly the same circumstances in which I have recommended it above (§ 253.), namely, when the os uteri is rigid. Soft lint or sponge may be used ; but in such a manner as to fill completely the upper part of the vagina.

272. *k.* When all other means have failed — when the face is blanched ; respiration is scarcely audible, or gasping or hurried ; the pulse almost imperceptible or gone ; the extremities cold or clammy ; the power of deglutition lost — *transfusion* should be resorted to, although the chances of success from it are few. Dr. HAMILTON has, however, seen recovery take place from this state by the ordinary means ; but so fortunate an issue is rare. The question only is, whether the practitioner should still persist in the use of some of the more appropriate means, or have recourse to transfusion. The contingencies of resorting to it ought not to be kept out of view ; for, if air pass into the vein, immediate death will follow. Phlebitis may even supervene although the operation has succeeded, and carry off the patient. The propriety and success of this measure have, however, been so far established by Dr. BLUNDELL, INGLEBY, and by some others, who have attempted it in circumstances of more doubtful propriety, as to justify the having recourse to it as an *ultimum sed anceps remedium*.

273. *l.* The *prevention of uterine hæmorrhage*, particularly in the puerperal states, is a subject of great importance. In the early months, the precautions recommended in the *article* on ABORTION (§ 26. *et seq.*) should be adopted. In order to prevent hæmorrhage after delivery, Dr. BEATTY and others advise an appropriate binder to be passed loosely round the abdomen, and drawn tight as circumstances may require. I am con-

vinced that a moderate degree of pressure on the parietes of the abdomen after delivery is of service in preventing not only uterine hæmorrhage, but also some other diseases, especially the different forms of puerperal fevers, &c.

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274. X. OF HÆMORRHAGE INTO SEROUS OR SHUT CAVITIES. — Owing to the organisation of serous membranes, hæmorrhage very seldom takes place from them ; the vessels with which they are supplied rarely experiencing that degree of relaxation admitting of the exudation of blood, or even of a portion of its colouring particles. When blood is effused into cavities formed by serous membranes, it proceeds from one or other of the following sources : — 1st, From the rupture of an aneurism ; — 2d, From the erosion, ulceration or rupture of an artery or vein ; — 3d, From rupture or laceration of an organ or part ; — 4th, From relaxation of the vital cohesion, with which the serous tissues and extreme vessels are endowed ; — 5th, From deficient crisis, or other

changes in the blood; — and, 6th, From the co-existence of the last two conditions. Hæmorrhage may occur from the first, second, or third of these causes, without any manifest indisposition, or disorder sufficient to induce the patient to resort to medical advice; but it never appears as the consequence of the other pathological states, unless in the advanced stage of the most dangerous, depressing, or malignant maladies. When the hæmorrhage occurs from the former of these, it is often to a very great amount; but it very rarely is excessive when it proceeds from the latter states. In all, the existence of the extravasation is to be inferred from the presence of the *constitutional symptoms* (§ 25.) usually produced by profuse hæmorrhages. When the states of vital power and of the blood cause sanguineous exudation into the shut cavities, ecchymoses or petechiæ in other parts of the body, and hæmorrhage from mucous canals, are very generally also observed.

275. i. HÆMORRHAGE FROM THE SEROUS MEMBRANES OF THE BRAIN OR SPINAL CHORD very rarely occurs, unless as a consequence of concussions or injuries of the head or spine; or from violent exertion, particularly in warm weather, or under a hot sun. Sanguineous effusion between the membranes may, however, follow the rupture of small superficial aneurisms or varices, and the growth of malignant or other tumours, or the occurrence of ulceration, implicating the membranes. Hæmorrhage in these situations cause apoplexy and paraplegia, or other comatose and paralytic states. I have seen very slight effusion in the spinal canal in a case of tetanus; and Dr. THOMSON observed it in a case of rabies. BONET, MORGAGNI, and OLLIVIER, have seen effusion simultaneously between the membranes of the brain and spinal chord. (See arts. APOPLEXY, BRAIN (§ 26.), PALSY, and SPINAL CHORD.)

276. ii. HÆMORRHAGE INTO THE PERICARDIUM may take place without rupture of the heart or large vessels within the pericardium, although more or less manifest rupture is the most frequent cause. — *Rupture* of the parietes of one or other of the cavities of the heart has been observed by SALZMANN, MORGAGNI, MORAND, PORTAL, CORVISART, LAENNEC, and several others enumerated in the subjoined references. In the larger proportion of these cases, the pre-existent lesions which occasionally give rise to rupture have existed. (See art. HEART.) But rupture of the coronary artery (VIRIDET), of the vena cava (WRIGHT), or of one of the pulmonary veins, or of an aortal aneurism, or perforation of the aorta (FIORATI), within the pericardium, may be the source of hæmorrhage. Several instances of these are referred to below. Blood may also be effused, or rather exuded into the pericardium, in greater or less quantity, or mixed with more or less water, without laceration or rupture of any vessel. Cases of this kind have been observed by VATER, BAADER, SANDIFORT, DE HAEN, THOMSON, HOOPER, myself, and others (see references); and occur chiefly in the advanced stages of adynamic, scorbutic, putro-adynamic, or malignant diseases. Sometimes the blood is poured out between the layers of the pericardium, forming sanguineous vesicles or ecchymoses. (MORGAGNI, DE LA

FAYE, STOLL.) When hæmorrhage into the pericardium arises from any of the kinds of rupture just enumerated, death generally takes place suddenly; but when it is exuded, as just stated, the already depressed vital power is increased, and the oppressed action of the heart is more slowly abolished by the effusion.

277. iii. HÆMORRHAGE INTO THE PLEURAL CAVITIES has been observed by MORGAGNI, PLENCIZ, CALDANI, STOLL, FRANK, JOHNSON, myself, and others. It most frequently arises from rupture of an aortal aneurism within the thorax. In this case, the blood is effused, in the first instance, into the posterior mediastinum, death seldom occurring until the accumulated blood lacerates this part, and opens the way to suddenly fatal effusion into one of the pleural cavities. The aneurism may be so large as to occasion symptoms which will lead to its recognition; or it may be so small, and attended by so little disorder, as to escape detection, as in the case of Sir DAVID BARRY, an eminent member of the profession. In him, the symptoms before, and the appearances after, death illustrated this procession of the morbid phenomena. Hæmorrhage into the pleural sac may proceed, also, from erosion or ulceration of the aorta (MORGAGNI, PORTAL); from rupture of the pulmonary vein (EICKEN); from rupture of the vena cava (PORTAL); or from rupture, or a varicose state, of some of the veins near the pleural surface (CALDANI, PORTAL, &c.). Hæmorrhage into the thorax is frequently consequent upon fractures of the ribs and wounds; and many of the instances, where it seems to have arisen spontaneously, have been induced or hastened by external injury or muscular exertion. — More or less blood may be *exuded* from the surface of the pleura, in states of very intense inflammation attended by diminished vital resistance, or during the advanced stages of putro-adynamic fevers and of other malignant diseases. But these are comparatively rare occurrences; and the blood effused is seldom pure, but mixed with much serum or watery exhalation; or, rather, the effused serum is more or less deeply coloured by an admixture of red particles.

278. iv. HÆMORRHAGE INTO THE PERITONEAL CAVITY, like hæmorrhages into other serous cavities, seldom occurs, unless as a consequence of external injuries or wounds. It sometimes depends upon rupture of a large vessel, or the laceration of some viscus, especially the spleen, liver, or stomach; but it may proceed from other lesions. BALLONIUS, PORTAL, DANIEL, and others, have recorded instances of its occurrence from rupture of the spleen; a case of which has come under my own observation. AYRAULT mentions an instance in which it arose from ulceration of some of the vessels of this viscus. BLANE found it to proceed from the surface of the liver. When the spleen or liver is engorged or enlarged, after repeated attacks of ague, particularly in warm or miasmatic countries, a comparatively slight external injury, or a concussion of the trunk, may occasion laceration or rupture of either, with extravasation of blood in the abdomen. Hæmorrhage in this situation may arise, also, from operations for strangulated hernia, especially when a portion of omentum has been removed; or from paracentesis in cases of ascites (BELLOCQ), or of encysted dropsy. Rupture of an aortal aneurism, or

of the aorta without any pre-existent aneurism (FERRO, J. P. FRANK, JAMES, ARNOTT, ROSE, HUME, &c.), of the vena cava (BONET, LANCI), of the vasa brevia (SANDIFORT), of the mesenteric artery (FERRO), and of the splenic artery (NENET), with hæmorrhage into this cavity, have been severally noticed. JENTY mentions a case in which rupture of the vena cava seemed to have been favoured by curvature of the spine. HEIM traced the hæmorrhage to the ovarian vessels; PALFYN, to the vessels of the omentum; GODELLE, to rupture of a Fallopian tube; and PORTAL, to the mesenteric vessels, in a female who had experienced sudden suppression of the catamenia in one instance, and to the ovarian vessels in another. In cases of tubal or ovarian foetation, extravasation of blood into the abdominal cavity is a necessary consequence of the growth of the ovum; and it has been observed in such circumstances by BÜTTNER, HEIM, CLARKE, PAINTER, myself, and many others.—OSIANDER met with hæmorrhage into the peritoneal cavity after delivery, that had arisen, in his opinion, from dilatation of the Fallopian tubes. The exudation of blood, or of a bloody serum, from the peritoneal surface occurs only during those morbid states, in which it has been observed to take place into the pericardium or pleura. (See art. PERITONEUM.)

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279. XI. HÆMORRHAGE INTO THE AREOLAR TISSUE, OR INTO THE SUBSTANCE OF AN ORGAN, occurs in two forms:—1st, Confined to a single part or organ;—2d, Extended to several organs, and more or less diffused. The pathological states of which either of these forms may be the result are chiefly the following:—a. Increased determination of blood or vascular action;—b. Active congestion, or engorgement from increased flow of blood to the part;—c. Passive congestion from interruption to the return of blood from the seat of hæmorrhage;—d. Softening, or diminished vital cohesion, of the organ in which extravasation takes place;—e. Disease of the vessels of the part favouring rupture, &c.;—f. Laceration or rupture of an organ from concussions or external injuries;—g. Loss of vital tone, expressed chiefly in the extreme capillaries;—h. A morbid state of blood;—and, i. These last two conditions conjoined. The more limited forms of hæmorrhage into cellular or parenchymatous parts may arise from either, or from more than one, of these pathological states; but the more diffused or extended depends chiefly upon the last three of them. The former may occur primarily, or without any very manifest sign of pre-existent disorder, although such disorder actually exists; the latter is generally the result of very serious and evident disease, especially of scurvy, purpura, putro-adynamic or malignant fevers, &c.—The organs, in the structure of which hæmorrhage most frequently occurs, are the brain and cerebellum, the spinal chord, and the lungs; and those in which it is more rarely observed are the spleen, liver, pancreas, and kidneys. It still more rarely takes place in two or more of these parts at once, unless in the

course of the dangerous constitutional maladies just mentioned. M. ROBERT (*Nouv. Biblioth. Méd.* t. ii. p. 74. 1826) records a case in which he found blood effused in the substance of the brain, lungs, liver, pancreas, and kidneys; but the pre-existent constitutional disorder was characterised by extreme adynamia, manifested especially in the vascular system and circulating fluids.

280. Hæmorrhage into the *areolar tissue*, particularly in those parts of it that possess the membranous form, giving rise to ecchymoses, petechiæ, &c., occur chiefly in *purpura*, *scurvy*, and the last stages of malignant exanthematous and other fevers; and in these diseases hæmorrhage generally takes place, also, from mucous surfaces, and sometimes, likewise, into the substance of one or more organs. In these cases, the blood is dark, dissolved, or deficient in crasis, and incapable of coagulating. The instances of "*Universal Hæmorrhage*" (*Hæm. Universalis*) recorded by several writers of the sixteenth and seventeenth centuries are entirely to be referred to the above maladies, or to a scorbutic, conjoined with a hæmorrhagic, diathesis, generated most probably by the nature of the food and modes of living, and to the putro-adynamic state which exanthematous and typhoid fevers then frequently assumed. (See arts. APOPLEXY, BRAIN, LUNGS, PALSY, PURPURA, SCURVY, &c.)

HÆMORRHOIDS.—*SYN.* Αἱμορροΐς (from αἷμα, blood. and ῥοή, a flux), Hippocrates, Galen, Celsus. *Hæmorrhoids*, Pliny, Linneus, Sagar, Sauvages, Cullen. *Hæmorrhoides*, Juncker. *Fluxus Hæmorrhoidalis*, Hoffmann. *Proctorrhæa*, Auct. var. *Proctalgia Hæmorrhoidalis*, Macbride. *Marisca*, Good. *Hæmorrhischesis*, Ploucquet. *Hæmorrhæa Vasorum Hæmorrhoidalium*, Swediaur. *Hémorrhôides*, *Flux Hémorrhoidal*, Fr. *Goldaderfluss*, *Hämorrhoiden*, Germ. *Morice*, Ital. *Piles*.

CLASSIF. — 1. *Class*, Febrile Diseases; 4. *Order*, Hæmorrhages (Cullen). 1. *Class*, Diseases of Digestive Organs; 1. *Order*, Affecting the Alimentary Canal (Good). II. **CLASS**, II. **ORDER** (Author).

1. **DEFIN.** — Pain, tension, weight, heat, or other uneasy sensation, referred to the rectum and anus, accompanied or followed by tumours in these parts, or by a flow of blood from them when the patient is at stool; recurring after intervals, and sometimes periodically.

2. **Preliminary Remarks.** — There are few diseases upon which so much has been written — ignorantly and dogmatically written — as upon hæmorrhoids. In modern times, the pathology and treatment of this disease have been too generally viewed in a limited point of view, and usurped by persons who have endeavoured to convince the public that they have made it the subject of especial investigation, or even of exclusive study. — Judging, however, from their writings, more mischief than benefit has thus arisen from the mechanical division of labour they have adopted; and not only have they failed in advancing our knowledge as to the nature and treatment of the malady, with which they profess so intimate an acquaintance, but they have actually overlooked, or been ignorant of, the part it occupies in the circle of morbid action, and they have frequently, even when affording

temporary benefit by empirical means, or by local or surgical aid, caused most serious consequent mischief. Those affected by this complaint are unable to foresee the consequences that may result from injudicious interference, especially if appropriate medical treatment be not afterwards pursued; and, whilst immediate relief, when procured, is made a matter of high commendation, both by those who receive, and by those who administer it, the remote or contingent bad effects are rarely traced by them to their origin, and are often of such a nature as to terminate all inquiry.

3. Of those who have professed an infallible cure for hæmorrhoids, there have been few who appear, from their writings, to have been acquainted with the nature of the complaint; with the relation in which it often stands to other morbid conditions; with its frequent existence as the more manifest part of a more important and concealed state of disease, and with the most safe and appropriate means of removing it. They have viewed it as a local disorder which is to be cured by local or surgical treatment, and not as a visceral disease often depending upon latent or extensive, morbid conditions, to which surgical measures may prove injurious; and for which such measures are at most only occasionally required, and then as adjuvants merely of a strictly medical, and often constitutional, treatment. Owing to an imperfect knowledge of the varieties of hæmorrhoidal tumours, and of their pathological relations — *a.* Fatal hæmorrhage has not infrequently resulted from excising or puncturing them; — *b.* Enteritis, peritonitis, and even internal phlebitis have followed the extirpation of them by ligature; — and, *c.* Fatal diseases of the brain, or of the lungs, or even of the liver, have arisen from the permanent stoppage of a discharge by these means, to which the system had become habituated, and which had warded off these and other serious maladies. This evacuation being arrested by these or other local measures, the safety valve to an overloaded state of the vascular system is permanently closed; and a source of local derivation and of discharge, that had preserved a vital organ from impending disorganisation, is cut off, without either preparing the system for the changes thereby produced, or substituting some other evacuation in its place. Persons who thus extend the division of labour principle to a science which admits not of it with advantage either to the branch which is thus attempted to be cultivated, or to those upon whom it is practised, may reply, that *they* have seen no mischief result from the means they employ; but the mischief in such cases is strictly of a medical nature, is often remote, and falls not within the sphere of those who thus unscientifically and empirically limit the practice of their profession. Division of labour may improve manual dexterity, or may extend mechanical contrivance; but it cannot improve pathological knowledge, nor illustrate the relations or associations of morbid actions, nor lead to truly scientific, and safe, and appropriate, and permanently beneficial, modes of cure.

4. I. **PATHOLOGICAL HISTORY OF THE DISEASE.** — The term *hæmorrhoids*, signifying, literally, a flow of blood, was made use of by HIPPOCRATES; and, down even to the present time, has been applied to a dilatation of the veins at

the extremity of the rectum, accompanied with a flow of blood; and the vessels of this part have been consequently called the hæmorrhoidal vessels. Many of the ancient and of the older writers have extended the term, not only to every complication of this complaint, but also to hæmorrhages from natural outlets; and thus hæmorrhoids of the uterus, of the bladder, and of the mouth, have been frequently used to denote hæmorrhage from these parts. Since the time of MORGAGNI the term has been applied indifferently to that morbid condition which was generally attributed to dilatation of the hæmorrhoidal veins, and to hæmorrhage from the rectum, although some authors have endeavoured to restrict it to one or other of them. But as the tumours and the flow of blood, whether appearing separately or in conjunction, arise from the same source; I shall consider them as varieties of the same disease. It will, however, be shown that the hæmorrhoidal tumours consist of different kinds or modifications of structural lesion, and that either of them may take place independently of, as well as in connection with, a discharge of blood from the anus.

5. i. *General Character and Symptoms of Hæmorrhoids.*—The first attack is usually slight, and often attended by little constitutional disorder. Slight pain, heat, weight or fulness, are felt at the extremity of the rectum, or about the sacrum, sometimes extending to the perineum, with obscure tenesmus or pain at stool, often with costiveness, and occasionally with an irregular or irritated state of bowels. The sensibility of the bladder or urethra is frequently also increased. After a short time, or in two or three days, at most, a slight flow of blood, generally of a bright colour is observed with the fæces, or smearing their surface. In some persons this flow does not take place, particularly in early attacks; but when it does, it is usually critical, and all the symptoms subside. When this discharge does not occur, as well as very frequently when it does, one or more tumours, of varied size, begin to appear within or at the verge of the anus. These tumours are preceded by a stinging or pricking pain, which increases as they enlarge; or are compressed by the sphincter ani. Sometimes blood oozes from their surface, or is squirted out through small apertures when at stool. Occasionally they remain dry, or are moistened by a colourless serum; but, in either case they collapse, after a short time, and entirely or partially disappear.

6. After a longer or shorter interval the same train of symptoms returns, generally in a greater degree, and acquires increased severity by the repetition. The pains are more acute, especially when sitting, standing, or walking; and often extend down the insides of the hips and thighs; the blood is discharged in greater quantity; and the tumours, if they have previously been developed, become larger or more numerous. Subsequently, when they collapse, and particularly when they have been often distended, they present so many flaps of skin, and when external form a serrated margin to the anus.

7. In irritable or weak persons, especially when the complaint is simple or primary, is severe, or returns often, the local alteration affects more or less the general health. Frequent chills, or coldness, alternating with flushes, dryness of

the mouth, hardness or frequency of pulse, costiveness, pallor of the countenance, and other febrile symptoms, are complained of. The functions of digestion are also more or less deranged, and the bowels are either costive, or irregular, especially when the complaint is dependent upon disorder of the hepatic organs. When it is associated with disease of the lungs, the symptoms referrible to the chest are generally materially alleviated by it, especially if it be attended by sanguineous discharge; and a similar result follows its occurrence in plethoric persons liable to headaches, or to congestion of the brain or liver. In all cases, however, care should be taken not to mistake the constitutional disorder, or the affection of remote organs, often occasioning the disease, for sympathetic disturbance preceding the hæmorrhoidal attack. A minute examination of the relation of the complaint with other ailments should always be instituted, before the indications of cure are determined upon.

8. Such is the usual course of hæmorrhoidal attacks; but the sense of weight, heat, fulness, or constriction, with more or less pain about the anus, and slight constitutional disturbance occasionally occur without either effusion of blood or the formation of tumours, even in old cases; and the hæmorrhage sometimes takes place without the tumours, but seldom without being ushered in by the other symptoms. Indeed, in all cases, indications of congestion, or of increased action of the vessels of the part are present in some degree, these states of the vessels constituting a principal feature of the complaint. Both the local and constitutional symptoms, and the structural lesions, show, that increased determination of blood to the extreme vessels of the part, in most cases, and impeded return of it from them, in others, are the chief pathological conditions of the disease.

9. ii. *Of the Hæmorrhoidal Tumours.*—The nature of these tumours was not understood until lately. They were usually distinguished into *internal*, and *external*, and into *bleeding*, and *blind*, piles, according to their situation in respect of the verge of the anus, and to their connection with a sanguineous discharge. But most of the older writers and many of the moderns, and amongst the latter the BELLS, HOME, BAILLIE, COOPER, &c., imputed them to dilatation of the veins. More correct views as to their structure were entertained first by LE DRAN and RICHTER, perhaps also by CULLEN and ABERNETHY; and more certainly by CHAUSSIER, DE LARROQUE, DE MONTÈGRE, CALVERT, and COLLES. From my own observations, as well as from the researches of these and other pathologists, hereafter referred to, there are *three kinds* of hæmorrhoidal tumours, differing essentially both in their structure and appearance. — *a.* The *first*, or most common kind is first seen in the form of fleshy tubercles, of a brownish or pale red colour, situate within the anus, or descending from the rectum. They have a somewhat solid or spongy feel; and, when divided, they present a compact or porous, and bloody surface. As the blood oozes from the cut surfaces, they become pale and flaccid. When the tumours are *external*, they are paler and more elastic; are infiltrated by serum; and are sooner produced, and disappear more readily, than when they are *internal*. — In

either case, they often contain a central cavity filled with fluid or coagulated blood, of a dark colour. This cavity is either smooth or granulated, and minute vessels may be traced into it; Mr. CALVERT states that it has no direct connection with any larger vessels. It is usually small; generally about the size of a pea, but sometimes that of a bean, or walnut, or even larger. More frequently, however, there is no regular cavity or cyst; the substance of the tumour being as if infiltrated with blood, which becomes coagulated and dark: but this appearance is not owing to extravasation, but rather to dilatation of a number of small vessels which traverse the tissue in the direction of the axis of the rectum, as, upon dividing the part longitudinally, numerous dark streaks are seen in its substance, whilst a section made transversely shows only small roundish specks.

10. The patient is usually made sensible of the development of these tumours, by a peculiar pricking or stinging sensation, within or at the margin of the anus; and one or more are found slightly elevated, or pressed downwards by the sphincter. The increase of these tumours takes place more by elongation than by expansion, and they assume a conical form, and are larger than their necks. Sometimes blood is exhaled from their surface; in other cases, or on other occasions, a serous fluid is exuded; and occasionally they are entirely dry, especially when they are external. In either case they generally disappear in two, three, or four days; but return again at an uncertain or at a regular period, and increase in size, becoming firmer in texture. After some blood is evacuated from them, or after the determination of blood to the parts has ceased, they collapse, leaving small pendulous flaps of skin, which ultimately disappear if the tumours have been small; but if they have been large, these flaps continue conspicuous, and give a projecting and irregular margin to the anus. Having been strangulated by the sphincter, or repeatedly engorged with blood or lymph, or chronically inflamed, these tumours become more solid and almost permanent, are a source of constant discomfort, and give rise to several of the consequences and complications about to be noticed (§ 20.).

11. The permanent state of the tumours is owing partly to the development of capillary vessels, and partly to the effused blood and lymph becoming organised; this latter circumstance especially giving rise to the excrescences, or irregular mass of tumours found around the anus in those subject to hæmorrhoids. — Occasionally the tumours acquire a very great size, arising from the effusion of much blood in the central cavity, and of blood and lymph in the cuticular envelopes. Instances of the enormous size of these tumours have been recorded by SCHMUCKER, CALVERT, and other writers about to be referred to.

12. *b.* Hæmorrhoidal tumours formed by a varicose state of the veins of the rectum are not so common as those just described. They seldom attract attention until they have made some progress, for the distension takes place very gradually, without causing much sympathetic disturbance, or materially increasing previous disorder. They are not so disposed to enlarge at particular pe-

riods, and are more permanent and less painful than the form already noticed. They are commonly of a dark or bluish colour, and soft and elastic to the touch. When compressed by the finger they become sensibly less, but return to their former state when the pressure is removed. They are round and broad at the base, and often distributed in irregular or ill-defined clusters. They evince little disposition to bleed, unless when ruptured or injured. They appear crowded together, extend up the rectum, are more or less internal, or become external chiefly during costiveness, or when the patient is straining at stool, or after a fæcal evacuation; whilst the former kind is limited, and generally external, or within the reach of the finger. VALSALVA, LUDWIG, PETIT, RICHERAND, BEGIN, CALVERT, and others, have seen hæmorrhoidal varices extend upwards along the rectum to the colon, especially in persons who had experienced obstruction of the portal circulation. M. BEGIN observes that, in most cases, the dilated superficial, submucous, or subcutaneous veins are only the smaller part of those surrounding the rectum. Sometimes the lower part of this intestine appears as if plunged in the middle of a network of dilated and engorged veins, forming a thick vascular ring, the incision or puncture of which may give rise to dangerous hæmorrhages. M. RICHERAND found, upon dissection, those varicose tumours filled with clotted blood, and their interiors continuous with those portions of the veins which retained their usual size. These dilated vessels presented alternately a state of distension and their natural calibre; and were continued in every direction, forming a plexus around the outlet of the bowel, the dilated portions being covered only by the thinned mucous membrane.

13. As the varicose tumours arise from many of the causes that produce the preceding form (§ 9.), and as both varieties occupy nearly the same situation, it may be reasonably inferred that they may exist together, or that the latter may often give rise to the former in connection with it. Now this is sometimes the case; inflammatory irritation, supervening in the course of the varicose form of the disease, superinducing the *mariscæ*, or the first variety of tumour, and thereby obscuring the varicose character of the former. Or a different procedure, as Mr. CALVERT supposes, may take place; the veins becoming dilated in consequence of the previous formation of the cellular tumours. These complications of the tumours can be ascertained only by a careful examination, and by attention to the history, progress, and symptomatic relations of the case.

14. *c.* A third form of hæmorrhoidal tumours, of an *erectile* character, was first noticed by Sir JAMES EARLE, and more particularly described by Mr. COLLES. These tumours are of different sizes; are soft and spongy to the touch, of a purplish colour, with a number of minute, but distinct, vessels on the surface of each. One, two, or more of these tumours protrude through the anus when the patient is at stool. Early in the disease the protruded parts retire spontaneously; but, in advanced stages, they require to be replaced by the hand. Alvine evacuation is followed by pain, which, especially when the disease is prolonged, does not cease for two or three hours; and is attended by losses of blood,

which sometimes occasion exsanguine exhaustion; the *sphincter ani* becoming wide and relaxed, and the tumours protruding. Dr. COLLES states that, on examination after death, he found bloodvessels as large as crow-quills, running for some way down the intestine, and then dividing into a number of branches; each of these vessels ramifying profusely, and each forming, by the interlacing of its numerous branches, one of these erectile or vascular tumours. The trunks and branches of these vessels were covered only by the lining membrane of the intestine.

15. iii. *Of the Hæmorrhoidal Discharges.*—A. The ancients believed the blood to be discharged from the tumid extremities of the hæmorrhoidal veins. MORGAGNI found these veins more or less dilated in several cases, and it was very generally considered that the blood oozed through, or proceeded from rupture of, these vessels. The investigations of modern pathologists have satisfactorily shown that the hæmorrhage may arise from various sources:—1st, From congestion of the vessels of the part followed by exhalation or exudation from the internal surface of the rectum;—2d, From irritation of this bowel, followed by vascular determination and sanguineous exhalation;—3d, From the surface of the hæmorrhoidal tumours, especially those belonging to the first and third varieties;—and, 4th, From the rupture of varicose or enlarged vessels. When the blood proceeds from the *first* or *second* of these sources, it may be seen to exude from the surface of the protruded portion of bowel; and the discharge generally removes all the symptoms characteristic of the complaint. It is also frequently preceded, and followed, by an exhalation of a serous nature, from the same source. Hæmorrhage, in connection with the common form of tumour, may arise from exhalation from its surface; or from the contraction of the sphincter forcing blood, in a fine stream, from one or more points of it; or from exhalation from the adjoining mucous surface, in consequence of congestion of, or of sanguineous determination to, the affected bowel. Where the vascular or *erectile* tumours exist, blood is always discharged, and uniformly from their surface. The *varicose* form of tumour is less frequently attended by hæmorrhage than any of the others. When the blood proceeds from the rupture of enlarged or varicose vessels, it generally flows in a stream whilst the patient is straining at stool, the flow increasing or returning when this effort is repeated. The passage, also, of hardened fæces over the congested or inflamed mucous surface of the rectum, or over the tumours developed beneath this surface, or over the enlarged or distended vessels, may lacerate or injure them in such a manner as to be followed by hæmorrhage, but in such cases the discharge is usually slight.

16. In many cases, the blood flows for a short time only, and is not again seen until the next attack. But in others, it is observed repeatedly when the bowels are acted upon, or the discharge is renewed when the fæces are expelled, for several days. It is generally of a red colour, and either covers, or follows, the fæcal evacuation; but when it is consequent upon venous congestion or dilatation, it is of a dark hue, and follows, or is partially mixed with, the fæces.

17. B. The *returns and amount of the hæmorrhoidal discharge* are extremely various; but in many instances a periodical return is observed in both males and females. In females, the hæmorrhoidal, not infrequently takes the place of the catamenial discharge, especially at the age when the latter usually ceases, and assumes a periodic form. In some instances, these evacuations alternate. When the morbid action has once commenced in this part of the body, it being favoured by peculiarity of structure and by several pathological relations (§ 30.), there is always a predisposition thereby formed to the recurrence of it; and the same causes still operating, it at length becomes habitual, and even necessary to the prevention of more serious maladies. It has been satisfactorily shown by observation that, as long as the causes of hæmorrhoids continue, the evacuation attending them is a wholesome occurrence, inasmuch, as an overloaded state of the vascular system, that would otherwise induce dangerous visceral disease, is thereby removed. In all cases, therefore, when hæmorrhoidal affections depend upon constitutional causes, or are connected with any indications of visceral disease, or have existed for a considerable time, their return should not be prevented, unless other sources of discharge, or other sanguineous evacuations are substituted for them: but, when they proceed from causes which are chiefly or entirely local, neither the vascular system nor constitution, nor any important internal organ manifesting disorder, a more active interference may be attempted; although even then with caution, especially if there be any tendency to vascular plethora, and if the principal causes of the disease are still in operation.

18. The *quantity* of blood lost in each attack may be very trifling—may not exceed a drachm or two; or it may amount, at one time, to several pounds. Instances are adduced by RHODIUS, FERNELIUS, LANZONI, HARRIS, SPINDLER, MOEHRING, HOFFMANN, EARLE, CALVERT, and others, in which the quantity discharged seemed enormous. Mr. CALVERT supposes that the vessels in such cases are in a state of extreme excitement: but this is by no means a correct inference; as, in most cases of excessive discharge, the hæmorrhage is passive or venous, or is consequent upon congestion, or upon interrupted circulation through the hæmorrhoidal vessels. The evacuation more commonly is excessive from its frequent return, than from its quantity at any one time; and it not infrequently induces a state of exsanguine exhaustion, requiring the most decided interference.

19. C. *A colourless Hæmorrhoidal Discharge*—*Mucous or serous Hæmorrhoids* (*H. mucosæ vel serosæ*) of Authors; *Hémorrhoides blanches*, BEGIN; *Medorrhæa Ani*, J. P. Frank—sometimes takes place, and either follows the discharge of blood, or attends the hæmorrhoidal tumours, especially those belonging to the first variety. It varies much as to quantity and appearance. It is either watery or mucous; or resembles a weak solution of gum; or it is albuminous and like the white of egg. When watery, serous, or mucous, it usually exudes slightly from the anus; when more abundant or albuminous, it is commonly passed at stool. In cases attended by much heat and irritation about the anus, a colourless exudation, consisting chiefly of an increased secretion from the follicular

glands of the part takes place. These varieties of colourless discharge are most frequent when there is little or no hæmorrhage, and when the disease is associated with *ascarides*, or with *leucorrhæa*, or with *pregnancy*.

20. iv. *Of the Consequences and Complications of Hæmorrhoids, local and constitutional.* — A. *Inflammation* is one of the most frequent morbid associations of hæmorrhoids. It is attended by more or less swelling and redness of the lower part of the rectum and anus; by throbbing and by increased sensibility and heat, aggravated by the passage of fæces. The sanguineous discharge is slight or absent; but if it become abundant, the symptoms subside. A mucous discharge is, however, not uncommon. Sometimes the inflammation is severe, and implicates not merely the mucous membrane and subjacent cellular tissue, but also in a slighter degree the prostate gland and neck of the bladder, occasioning much pain in the perineum, sacrum, &c., with dysuria, or even strangury. The irritation may even extend to the womb in females. The tumified state of the lower part of the intestine in these cases, together with the inflamed tumours, and the spasmodic constriction of the sphincter, produces obstinate constipation and straining or tenesmus. Not infrequently the protrusion of the tumours, when internal, with a portion of the mucous membrane, follows the action of the bowels, and the inflamed tumours, being strangulated by the sphincter, become remarkably painful, or even ultimately slough. With the severity of the local symptoms, the constitution generally sympathises; and febrile symptoms are developed, particularly in irritable or nervous temperaments.

21. B. *Fissures or rhagades of the anus* are not uncommon in cases of hæmorrhoidal tumours. They may commence in small longitudinal ulcerations; but they more frequently seem to take place as follows:—When the tumours are large and numerous, hardened fæcal matters, in passing forcibly between them, crack or slightly tear them at their bases, the chronic inflammation in this situation hardening and rendering the tissues less yielding to any distending power. These fissures are most apt to occur when the tumours are situated upon the sphincter. They are usually slight at first, but they enlarge, owing to the frequent operation of the causes that produced them and to the lodgment of fæcal matters, and occasion great pain, which continues for some hours after each stool, and spasmodic constriction of the sphincter. Herpetic or other chronic eruptions sometimes also appear about the anus, and favour the supervention of these fissures, by rendering the surface harder and less capable of distension, or by diminishing its vital cohesion. Fissures of the anus mostly occur as a consequence of the first and third variety of hæmorrhoidal tumour.

22. C. *Ulceration or abscess, frequently passing into fistula*, often follows hæmorrhoids, particularly when inflammation occurs. When the inflammation is superficial, affecting chiefly the mucous membrane, it gives rise to ulceration in one or more points, especially in the situation of the tumours; and it may penetrate deeply, or be followed by small abscesses, either in these tumours or in their vicinity. When the inflammation is more deeply seated, implicating the cellular and

adipose tissues, an abscess then forms very readily and often rapidly. Pain, tension, and heat about the anus are then severe, and with the throbbings, extend up the pelvis. When the abscess is anterior to the anus, and presses upon the urethra, and parts adjoining the neck of the bladder, the suffering is very great, and sometimes is attended by strangury or total retention of urine. The abscess, in the female occasionally extends to one of the labia, or even breaks into the vagina, or passes into fistula in that, or in an adjoining situation. Of this I have seen several instances.—(See art. RECTUM.)

23. D. *Hæmorrhoidal tenesmus, or spasmodic constriction of the sphincter, frequently with protrusion of the mucous coat of the rectum*, is a common complication of hæmorrhoidal affections, particularly when the tumours are inflamed, or when there are fissures between them (§ 21.). If the tumours are seated within, or above the sphincter, or if the mucous or submucous tissues are much tumified or infiltrated by inflammatory determination, the actions of the parts of the bowel above this, or the efforts at expelling fæcal matters, are attended by much tenesmus and often cause a protrusion of the tumours and tumified parts, sometimes to the extent of partial invagination of the rectum. When the sphincter is spasmodically constricted, in consequence either of the irritation of the internal surface of the intestine, or of fissures in the anus, the veins are grasped so firmly by it as to give rise to a congested or varicose state of those external to, or below, the constriction, and the disease is thereby aggravated and prolonged. This irritable or spasmodic state of the sphincter may exist in nervous persons, without fissure or inflammation, and be attended by great pain, as shown by M. DUPUYTREN; but it most commonly is associated with one or both of these morbid states, as well as with a bloody or colourless discharge, and with hæmorrhoidal tumours, or with either of them only.

24. E. *The pain of hæmorrhoids* varies in character in different cases. In some it is constant; aggravated upon passing a motion, and is attended by heat and throbbing: it is then owing chiefly to inflammation. In others it is intermittent, extremely severe at times; comes on and ceases suddenly; is eased by pressure; and is of a nervous character. This kind of pain is often connected with spasmodic constriction of the sphincter, and was denominated *proctalgia* by SAUVAGES. The pain is often also connected with fissure, as shown by BOYER, MERAT, MONTÈGRE, and others; and is then pungent, lancinating, cutting, lacerating or peculiar, and greatly aggravated by the action of the bowels. In many cases, the pain extends to the insides of the hips and the back of the thighs, or to the urinary organs and urethra; and occasionally up the pelvis into the abdomen. Indeed *colicky pains*, often of a severe kind, usher in an hæmorrhoidal attack, as well as supervene in its course, or upon certain modes of curing it, as upon the application of ligatures on the tumours.

25. F. *Irritation or inflammation of the neck of the bladder and prostate*; painful affections of these parts of the urethra, and of the vesiculæ seminales; difficult or painful micturition; retention of urine; and prolapse of a portion of the rectum; are not infrequent complications of

hæmorrhoids. As more remote consequences of the disease, may be mentioned, fistula in ano, recto-vaginal fistula, induration and thickening of the surrounding cellular tissue, permanent stricture of the rectum, and chronic or constant prolapsus ani. These, and some other organic lesions consequent upon hæmorrhoidal attacks, are fully described in the article RECTUM.*

26. II. DIAGNOSIS. — *a.* Hæmorrhoids may be confounded with *Intestinal Hæmorrhage* (§ 185.); but in that disease the local symptoms and lesions characteristic of hæmorrhoids are not present in a prominent or primary manner; nor can a varicose state of the vessels, nor any other form of tumour, be detected upon examining the rectum with the finger. Besides, intestinal hæmorrhage is more generally a symptom of an acute or dangerous visceral disease, and more frequently appears in the advanced stages of ædymic or other fevers, or as a symptom of non-febrile cachexia, than the hæmorrhoidal discharge, whilst this latter is more commonly the principal and most manifest, if not the primary, affection. It may, however, sometimes happen that a patient subject to hæmorrhoidal affections is seized with low fever; or with remittent or simple fever, complicated with congestion or obstruction of the liver, with or without jaundice; and hæmorrhage from the bowels supervenes. The question is, whether, in either of these cases, the blood is discharged from the testinal mucous surface (see arts. *FEVERS* (§ 474.), and *HÆMORRHAGE* (§ 185. 196.)), or from the hæmorrhoidal vessels or tumours (§ 15.). These are not uncommon cases: I have seen several. A fatal instance of this kind occurred in my practice whilst writing this article. The diagnosis is of importance, as the prognosis and treatment are both affected by it. If pain, tumours, or other symptoms referrible to the rectum or anus, are present; if they be increased by the action of the bowels, and the blood discharged at that time appear fluid and recently extravasated; and if an examination of these parts, as far as it can be accomplished, show the presence or increase of hæmorrhoidal disease; then the hæmorrhage

proceeds from it: but if the blood be clotted, very dark, mixed with the secretions or fæces, or consist of small coagula, the calls to stool not being attended by any distress, the source of the discharge is above that which is the seat of hæmorrhoids, and the examination post mortem will show the accuracy of the inference.

27. *b.* Hæmorrhoidal tumours may be confounded with *fungous* or *polypous* tumours or excrescences of the rectum or anus; but these latter enlarge progressively; their surfaces are indolent; and they rarely give rise to hæmorrhage, or to paroxysmal attacks resembling hæmorrhoids, or to inflammation of the adjoining parts. *Venereal excrescences* about the anus may be ascertained by the history of the case, by their development exteriorly to the rectum only, and by the morbid appearance of their surface. The slightest observation, and the least experience, are sufficient for the diagnosis in these cases.

28. III. CAUSES. — *a.* The *antecedent* or *pre-disponent causes* of hæmorrhoids are temperament, and constitution, age, sex, climate, and modes of living. Persons of a melancholic, bilious, or sanguineo-bilious temperament, of a plethoric habit of body, and with a venous system prominently developed, are most liable to this disease. The remark of STAHL, that “*subjectis accidere solet facilius hic fluxus sanguineo-cholericis, et sanguineo-melancholicis plethorâ affectis*,” is very near the truth. Owing to this predisposition, the complaint is often *hereditary*, as fully shown by HOLLER, ALBERTI, LARROQUE, MONTÈGRE, and others. It is most common in *mature age*, when the abdominal viscera are in a state of greatest activity, and the vascular system most plethoric, and, consequently, when these viscera are most liable to disorder and to vascular determination. When it occurs in early puberty, or soon afterwards, it is chiefly owing to the determination of blood to the vicinity of the rectum, often favoured or induced by excessive venereal indulgences. Hæmorrhoids seldom appear before puberty; and yet I have seen several instances of it in children. I very recently prescribed for the disease in a boy of five years. TRNKA, ALBERTI, and many of the authors referred to, adduce similar cases, most of which they impute to hereditary disposition. Authors differ as to its greater prevalence in *males* or in *females*. Much depends upon the circumstances in which the latter are placed; but it is more frequent in females about the period of the cessation of the catamenia, and afterwards, and during pregnancy, than at any other time; and these and other circumstances may render it almost, if not quite, as frequent in them as in males. M. MONTÈGRE supposes that it is more common in females in an accidental or occasional form, and in males in a regular or constant manner.

29. Climate has some influence in disposing to the complaint. Warm, moist, and miasmatic climates are much more favourable to it than those which are dry, cold, or temperate. The former develop the bilious, melancholic, and choleric constitutions, relax the venous system, and favour obstructions of the abdominal viscera—changes most conducive to hæmorrhoids. Much, however, will depend upon the *modes of life*, the *manners*, and the *morals* of the inhabitants.—*Habits of life* exert the greatest influence in causing

* M. MONTÈGRE has given the following classification of hæmorrhoidal complaints:—

1. *Blind or dry Hæmorrhoids (Cæcæ).*
2. *Hæmorrh. with Discharge (Fluentes)* — { White Discharge (*Albæ*), with Catarrh of the Intestines.
Sanguineous Discharge (*Sanguinolentæ*) — { By Exhalation.
By Rupture.
3. *Hæmorrh. with Tumours (Tumores)* — { Varicose (*Varicæ*) — { Dry.
Bleeding.
Mariscous (*Mariscæ*) — { Dry.
Bleeding from dilated Pores.
4. *Painful Hæm. (Dolentes)* — { Inflammatory.
Nervous.
Fissured.
5. *Hæmorrh. with Constriction of the Anus (cum Contractione Ani)* — { Indolent. — From Induration of the Tissues.
Painful — { Spasmodic.
Schirrous.
6. *Hæmorrh. with Ulceration (Ulceratæ)* — { Superficial.
Fistulous.
7. *Hæmorrh. with Prolapsus (cum Procidencia Ani)* — { From allongation of the internal Membrane.
From Invagination of the Intestine.
8. *Hæmorrh. with Irritation of the Bladder (cum Irritatione Vesicæ Urinariæ)* — { With Dysuria.
Strangury.
Hæmaturia.

the disease. Sedentary occupations, and indolence with luxurious nourishment, must, as Dr. J. JOHNSON remarks, either find some outlet to the superabundant fluids, or bring on a train of diseases. Hæmorrhoids and gout are the common consequences of this state of things. Many people who have led an active life for many years, on leaving off business and indulging in repose, become, for the first time, affected with piles. The sitting posture, retained for many hours in succession or habitually, particularly on warm or soft cushions; full or rich food; heating or stimulating diet, and intoxicating beverages; inordinate excitement of the sexual organs; habitual constipation, and the use of warm or irritating lavements, and strait corsets, not only predispose to, but often also directly produce this complaint. It is owing to the association of several of these causes that piles are so common amongst persons occupied at the desk, and amongst tailors and shoemakers, as well as among the inhabitants of Turkey and of other eastern countries. It has been very often remarked, that hæmorrhoids are more prevalent in spring and summer than in winter; and this appears to be the case. A disordered state of the alimentary canal and of the liver, and the suppression of other discharges, have a great influence in favouring an attack.

30. *b.* The *occasional exciting causes* are—1st, Whatever inordinately excites the rectum and lower part of the colon, particularly too large or too often-repeated doses of calomel, aloes, colocynth, black hellebore, camboge, or scammony; occasionally, also, of rhubarb, the neutral sulphates, and of any other purgative injudiciously prescribed or exerting a drastic action; the passage of acrid bile; the irritation caused by worms; many of the substances said to be emmenagogue; all the preparations of mercury in large or frequent doses; the liquor arsenicalis when thus employed; and the inappropriate use of chalybeates;—2d, Whatever prevents the return of blood through the hæmorrhoidal veins, as constipation, the lodgment of hardened fæces in the rectum or lower parts of the colon, and repeated efforts at evacuation; torpor, congestion, or structural lesions of the liver, and obstructed circulation through the portal system; the pressure of a pregnant, enlarged, or displaced uterus, or of a diseased ovary; and disease of the prostate or sphincter ani;—3d, Whatever excites and determines an increased flow of blood to the sexual and urinary organs, as venereal excesses, spirituous liquors, the irritation of calculi, of cantharides, &c.;—4th, External irritation of adjoining parts; prolonged walks in hot weather; riding in coaches, or on horses or mules without a saddle,—“*Nam solet a nudo surgere ficus equo*” (MARTIAL, l. xiv. epig. 86.); and the frequent application of leeches to the anus;—and, 5th, The local influence of cold or warmth, as sitting on the ground, or on stone seats or on damp cushions, and the habit of standing with the back to the fire.—Besides the foregoing, various other circumstances occasionally cause this complaint, as the more violent mental emotions, both exciting and depressing; errors of diet and of regimen; inordinate excesses of any kind; and diseases of other organs, particularly those of the lungs or

liver. Hæmorrhoids are, moreover, sometimes *critical* in other maladies, especially in fevers and in inflammations of the brain, or of any of the viscera lodged in the thoracic and abdominal cavities. Owing generally to the association of several of the above causes, this complaint is very common in the upper classes of society, in both its simple and more complicated states; and hence the number of treatises which have appeared on it and its consequences.

31. IV. PROGNOSIS.—A favourable opinion of the result may generally be entertained in all the simple states of this affection, particularly when the patient is not far advanced in life, when the constitution is not in fault; and when the lungs, the liver, and brain present no tendency to disease. In other circumstances, and when the complaint is periodic, the removal of it, however cautiously effected, may be followed by serious effects, and especially by diseases of the lungs. (See § 3.30.) In all cases, the prognosis should be founded upon a knowledge of the causes, of the form, and of the complication of the disorder. If the causes be not obviated, either the disease will return after a time, or it will be followed by a more serious malady. The extent and frequency of the discharge must always be taken into account as well as the form of hæmorrhoidal tumour. The more common variety of tumour is seldom attended by any risk, unless in the circumstances just alluded to, or when otherwise complicated, locally or constitutionally. But the varicose tumours require a more cautious or reserved opinion; for, under the most judicious management, the more prominent or distended parts of the vessels may burst by a thinning process, and occasion profuse hæmorrhage. They are, also, generally connected with more or less visceral disease or constitutional disorder. The prognosis should not be materially different from that just stated, when the complaint is complicated with *inflammation*, for some one of its terminations, as abscess, ulcerations, or fissures between the tumours, fistula, spasm of the sphincter, prolapsus or invagination of a portion of the bowel, and even permanent stricture of the rectum, may take place, however judicious the treatment may be, and occasion very great or prolonged suffering, if not imminent danger. When the complaint is connected with visceral disease, and especially with pulmonary disease, the opinion should be formed chiefly with reference to this association; and the hæmorrhoidal affection should be so managed as to prove a derivation from the internal malady, and to prevent its increase.

32. V. TREATMENT.—A. *The propriety of suppressing the hæmorrhoidal discharge* ought always to be considered when entering upon the treatment of it. CULLEN erred egregiously in considering the complaint as generally local, and in recommending a local treatment; and in this he has been too closely followed by surgical writers. This practice, as Dr. J. JOHNSON observes, of removing the disease as speedily as possible, is very well in sound constitutions; but where there is any defect in the system, or organ predisposed to disease, we should be careful in avoiding the sudden stoppage of the hæmorrhoidal movement or discharge. HIPPOCRATES observed that this complaint often protected the system from other maladies; and a similar opinion

has been offered by STAHL, HOFFMANN, ALBERTI, ROSEN, RICHTER, and others. This is especially applicable to persons who are liable, hereditarily or otherwise, to gout, consumption, apoplexy, palsy, or other kinds of hæmorrhage. Mr. HOWSHIP states that a gentleman, subject to periodic hæmorrhoids, was induced by a quack, and in opposition to the regular opinion, to have recourse to a strong vitriolic wash. This cured the discharge; but the patient died soon afterwards of gout in the stomach. M. MONTEGRE adduces proofs of a number of diseases having been produced by the suppression of piles; the most common of these being fevers*, hæmorrhages, inflammations of the lungs or pleura, phthisis, apoplexy, and various other internal and organic maladies. Mr. CALVERT saw gastric fever follow the application of cold water to the anus for hæmorrhoids. I was lately consulted in a case of apoplexy consequent on the stoppage of the discharge; and, some years since, in a case of fever, and in another of melancholy, from this cause.

33. *B. Constitutional Treatment.*—The oftener the hæmorrhoidal attack is renewed, the more liable will it be to recur, and the greater will be the risk of effecting a sudden cure. On this account it is most desirable to ascertain the causes of the complaint, and to remove them, as being most necessary not only to the efficacy but also to the safety of the treatment. Piles being among those diseases which it is sometimes dangerous to cure, care should be taken to distinguish those which ought, from those which ought not, to be removed. M. MONTEGRE justly remarks, that those which are of a constitutional nature, or which the constitution, as it were, requires, are generally of long standing—sometimes from youth; or they replace some serious or habitual affection: they are hereditary, attended by well-marked indications of plethora—take place from various and opposite exciting causes, or without any obvious cause—are preceded by constitutional symptoms—are succeeded by an improved state of health, whether there be discharge or not—and, finally, are accompanied or followed by inconvenience when interrupted or suppressed: all these circumstances indicating a constitutional disorder which it is dangerous to meddle with too rashly. When hæmorrhoids are more strictly accidental, the symptoms and occasions of their appearance are different from the above, and they may be sub-

jected to more active treatment. But even these become, after frequent repetition or long continuance, habitual to the system—often a safety valve to the circulation, and require a constitutional and cautious treatment. In most circumstances, however, of the disease, strict attention to diet, and to the state of the excretions, with stomachic or deobstruent laxatives, when there is any tendency to constipation; and with cooling diaphoretics when there is any febrile movement present, will be productive of benefit. When the secretions and excretions from the bowels are deficient, a few grains of blue pill, or of hydrargyrum cum creta, with one of ipecacuanha, and five or six of extract of taraxacum or of soap, should be taken at bedtime, and a draught, with equal parts of the compound infusions of gentian and of senna, the next morning, or a teaspoonful of either of the electuaries in the *Appendix* (F. 82. 89. 98. 790.), at night. When constitutional irritation exists, the camphor mixture, and solution of the acetate of ammonia, may be given with sweet spirits of nitre, and the inspissated juice of the sambucus; or the infusion of the tilea Europea with the subcarbonate of soda or of potash, with the extract of taraxacum. The nitrate of potash may also be given with the electuary, or in a diaphoretic or diuretic mixture. When the complaint is connected with vascular plethora, the treatment should be based upon this circumstance; and a spare farinaceous diet, an open state of all the emunctories, and regular exercise, ought to be enforced. If these be neglected, the suppression of the discharge may be followed by some one of the maladies alluded to above. In other respects, the treatment should be directed according to the peculiarities and complications of the case, as shown in the sequel; and organs evincing a tendency to disorder ought to be protected, either by allowing the hæmorrhoidal complaint to proceed, or by increasing it (§ 47.) when it is insufficient for this purpose, or by establishing other sources of irritation or of evacuation.

34. *B. Treatment of the Hæmorrhoidal Discharges.*—*a.* While the *sanguineous discharge* is moderate, returns after considerable intervals, and leaves no unpleasant effects, it is only a salutary adjustment of the constitution, attended, it is true, with inconvenience, but with more than counterbalancing advantages. When, however, it becomes excessive, it ought immediately to be restrained. Its excess should be inferred rather from the effects than from the quantity; for some persons will lose large quantities of blood, almost daily for some time, and yet be otherwise in good health. But, whenever the discharge is followed by pallor, debility, syncope, or convulsions or spasms, it ought to be arrested. Like other hæmorrhages (see the art. § 35, 45. *et seq.*) it may be either *active* or *passive*; and the treatment should be directed accordingly.

35. *a.* In the *active form*, vascular determination should be diverted from the rectum, by quietude and the horizontal position; by bleeding from the arm when the pulse admits of it; and by cooling drinks and diaphoretics. If these do not succeed, cupping-glasses, with or without scarificators, according to the state of the system, may be applied over the hypochondria, as advised by the ancients, or upon the loins or sa-

* A gentleman, between fifty and sixty, who had suffered long from hæmorrhoids and prolapsus of the mucous membrane of the rectum, had remained free from the complaint for a considerable time, in consequence of using cooling astringents, &c. locally, as advised by a person who had derived benefit from them. I was called to him, and found him labouring under a most dangerous form of fever, complicated with deep jaundice, and attended by a conviction of approaching dissolution. His pulse was upwards of 120, soft, small, and weak. His bowels were relaxed, the stomach irritable, and the evacuations white. He had been attacked only the day before, and was restless and desponding. Calomel with camphor; effervescing draughts with the carbonate of soda in excess; Seltzer water with old wine; laxative enemata, and various other means, both internal and external, were prescribed according to the rapid progress of the malady. On the third night, he became delirious; soon afterwards, comatose; and, although the hæmorrhoidal discharge returned, from the use of the calomel, he died on the eighth day of the disease. Inspection of the body was not permitted.

crum. Derivatives, especially sinapisms, the terebinthinate epithem, or blisters, may be placed on these or other parts of the surface; and astringent or cold lotions, or injections, may be employed. — β . In the *passive form*, the acetate of lead with opium; the preparations of cinchona with the mineral acids, or the sulphate of quinine in the compound infusion of roses; the tincture of the muriate of iron, and other chalybeates; the balsams of Peru or of Copaiba, in large or repeated doses, or the terebinthines, and the oil of turpentine, administered either by the mouth or in enemata, are the most efficacious means of arresting the discharge. (See art. HÆMORRHAGE, § 45. *et seq.*) — γ . *Plugging the rectum*, and the *actual cautery*, have been recommended in extreme circumstances. If the source of hæmorrhage is above the sphincter, a fatal internal discharge may follow from having recourse to the former of these. It is not practicable to resort to the latter, unless the spot whence the blood issues can be brought into view.

36. *b. The colourless mucous discharge* (§ 19.) from the anus, although a frequent attendant upon piles, is not necessarily so, as it may be occasioned by ascarides, &c. If it accompany internal or external tumours, and be independent of inflammation, slightly astringent and detergent injections; the internal use of the balsams, or of the spirits of turpentine, or of the balsams or terebinthines combined with magnesia; and an occasional recourse to the stomachic aperient mentioned above (§ 33.), will generally remove it. When it is connected with inflammatory irritation, the means about to be stated (§ 42.) is most appropriate.

37. *D. Treatment of the Hæmorrhoidal Tumours.* — In all cases, the parts should be carefully examined by the practitioner, since the accounts given by patients themselves are very fallacious. Besides, the particular kind of tumour must be ascertained before the means of cure can be appropriately directed. Whether the piles be internal or external, or both, the anus should be washed with cold water after each evacuation; or with yellow soap and water, as suggested, in the course of some excellent remarks on the treatment of the disease, by Mr. MAYO. If the piles be internal, this should be done before they are returned. If they cannot be returned, or are permanently protruded, or altogether external, whatever may be their form, *pressure* is one of the best remedies that can be applied to them. After each evacuation, and having thoroughly cleansed the parts, a conical pad, or piece of ivory, made to slide along a bandage or handkerchief, should be passed between the nates, and fastened above to a cincture or belt worn around the loins, in the form of the T bandage. The pad may be provided with a concentric wire spring, the more internal coils of which rise in a conical form. This is the best external mode of employing pressure. — When the tumours are internal, and protrude at stool, dragging the mucous coat with them, or when they consist chiefly of varicose veins, a short metallic bougie, of an oval form, with a short slender neck, and a conical base to press upon the anus externally, may be attached to the bandage, carefully introduced into the rectum, and worn occasionally. Pressure will thus be

made both above and within the sphincter, as well as without it. When introduced, the part of the *bougie* which rises above the sphincter being oval, varying in diameter with the peculiarities of the case, and being many times as thick as its slender neck grasped by this muscle, necessarily, from its shape, retains itself within the rectum, draws up with it the external tumours and prolapsed portion of the bowel, and presses its conical base externally against the anus, and upon the tumours or enlarged veins external to the sphincter. This combination of the *internal* with the *external method* of making pressure on the anus was introduced by Mr. MACKENZIE into practice, and is often extremely efficacious in the treatment of hæmorrhoids, and of the prolapsus attending them.

38. Before having recourse to either of these, it will often be of service to wash out the rectum immediately after each evacuation, by injecting some cold or tepid water, with or without a few grains of sulphate of zinc dissolved in it; and, if the parts be painful or irritable, a little cold cream, or of a slightly anodyne or astringent ointment, or of any other most appropriate to the circumstances of the case, should be applied to the surface of the bougie, when about to introduce it. At the same time, the bowels ought to be kept gently open by any mild or cooling purgative that will not irritate the rectum. I have found equal parts of the compound infusions of gentian and of senna, with the soluble tartar, &c. taken at bed-time, the most beneficial, when the digestive organs were weak; and one or two teaspoonfuls of either of the following electuaries, or of one of those in the *Appendix* (F. 82. 98.), the most serviceable when plethora or hepatic disorder was present, or even when there was a manifest tendency to them.

No. 242. R. Potassæ Supertart. in Pulv. ʒj.; Sulphuris præcipitat. ʒij. — iv.; Confect. Sennæ ʒij.; Syrup. Aurantii vel Zingib. q. s. ut fiat Electuarium molle.

No. 243. R. Potassæ Nitratis ʒij.; Confect. Sennæ, et Syrup. Zingiberis, aa ʒjss.; Succ. Spiss. Sambuci ʒj. M. Fiat Electuarium.

39. These electuaries may be variously modified, according to circumstances; and the confectio piperis nigri may be substituted for the syrup, or the inspissated juice of the sambucus, or a small quantity of it may be taken twice or thrice daily, when there is much relaxation of parts, or in cold, languid, or leucophlegmatic habits. Aperient medicines, in hæmorrhoidal cases, should always be taken at bed-time, in such doses as to operate only once, or at most twice, in the morning. Subsequent irritation of the bowels during the day will thus be prevented, especially if the rectum be washed out by a lavement after passing a motion. When it is necessary to have recourse to the short bougie described above (§ 37.), it should then be introduced; its passage being facilitated by an anodyne or slightly astringent ointment or pomade.

40. When the tumours are internal and protrude only at stool, and when they continue, notwithstanding the use of the constitutional treatment advised above, aided by the modes of employing pressure, just described, the removal of them by an operation may be entertained; but it certainly ought not to be practised, unless it be clearly ascertained that they belong to the *first variety* (§ 9.), and never, if they present the

varicose character (§ 12.). Most surgical writers make no distinction between these tumours, and resort either to the *ligature*, or to *excision*, to remove them. Mr. COPELAND refers to several instances of dangerous and even fatal results from having recourse to the ligature; and yet Dr. J. JOHNSON, in an able review of the subject, states that he knows "that Mr. COPELAND's practice is, and long has been, almost invariably to employ the ligature;" his success by means of it entirely depending upon his drawing the thread as tight as possible, so as completely to destroy the vitality of the tumour. This is certainly the only mode in which the ligature ought to be employed, and the one in which it has been generally recommended and practised since the days of GALEN: but Mr. COPELAND only states the danger of this method, in his work; and neither advises it, nor points out the mode of performing it! LE DRAN considers that, in addition to the pain, the ligature may cause inflammation extending along the rectum to the intestines; and M. MONTÈGRE objects to it for the following reasons — 1st, The operation is often difficult, and always very painful; — 2d, The tumours sometimes resist the ligature and, instead of falling off, ulcerate; — 3d, As they can only be tied in succession, the irritation produced by the first operation increases the swelling and inflammation of those remaining; — 4th, The ligature may produce all the effects of strangulation of the gut. Dr. J. JOHNSON thinks that these objections are founded on the inefficient mode of applying the ligature, and that few or none of them are valid, provided the thread is drawn to a proper degree of tightness at the beginning. I believe that even this more efficient mode is not secure from danger; that, in addition to the evils enumerated by MONTÈGRE, (a) inflammation of the hæmorrhoidal veins, extending even to the liver, (b) locked jaw, (c) retention of urine; and (d) contraction of the rectum, have in some instances resulted. It were to be wished that those who have been most in the habit of resorting to it, would state more fully than they have done, the results and the circumstances in which they confide chiefly in it. In the varicose form of the complaint, it is a most dangerous mode of treatment.

41. *c. Excision* of the tumours is preferred by LE DRAN, ABERNETHY, MONTÈGRE, COLLES, and CALVERT; whilst Sir ASTLEY COOPER and Mr. HOWSHIP are favourable to the *ligature*. Mr. MAYO advises this latter method for all internal piles; his mode of operating being the most judicious that can be followed. Sir E. HOME and Sir C. BELL recommend a combination of both methods — the excision of the tumour immediately after the application of the ligature. There can be no doubt of the danger of excision, and that it is very liable to be followed by great hæmorrhage, and by peritoneal inflammation, particularly when the tumours are formed by varicose veins. Numerous cases illustrative of the fatal or dangerous results of this practice are adduced by several of the authors referred to. When the piles are external, are covered by skin, and are formed as described, when considering the first form of tumour (§ 9.), excision is preferable. But I believe, from considerable experience, that either operation will be very seldom required, if the medical treatment be judiciously

conducted. Neither the one nor the other should be resorted to without a careful examination of the pathological relations of the case, and of the form, state, and complications, of the local affections; nor without a preliminary treatment, consisting of one or two small cuppings over the sacrum, of a regulated state of the bowels, moderate diet, and of abstinence from fermented or spirituous liquors. In nervous and irritable persons, either operation is hazardous, and should not be performed unless in urgent circumstances. Dr. BURNE states that he has seen "a person die of sympathetic adynamic fever in four days after the removal of piles by a most accomplished surgeon. The nervous system of this patient was disturbed, prior to the operation, the shock of which excited high febrile movement and delirium, soon terminating in dissolution."

42. *E. Treatment of Inflamed Piles.* — The application of leeches to inflamed hæmorrhoids is very often advised. MONTÈGRE disapproves of the practice, as it frequently draws the blood to the parts. I believe that cupping on the loins or on the perineum is more beneficial. As more or less strangulation produces or accompanies the inflammation, the tumours should be pushed within the sphincter, if this can be done without aggravating the affection; and poultices or fomentations applied. When the inflammation is abated, MONTÈGRE advises injections of cold water; but care should be taken not to lacerate the tumours by the pipe of the syringe, as serious consequences may accrue, as in the cases recorded by ZACUTUS LUSITANUS, GASSENDI, and others. The external application of lint, moistened with a cooling and anodyne lotion, or frequently sponging the parts with it, will often afford relief. Equal parts of the solution of the acetate of lead, and of laudanum, diluted with rosewater will generally answer the purpose. If this lotion is not of service, it may be relinquished for poultices or poppy fomentations. *Incisions* or punctures of the inflamed and protruded piles are advised by some surgeons. MONTÈGRE condemns the practice; and Mr. CALVERT states that he saw an instance of fatal hæmorrhage from having had recourse to it. Much more dependence should be therefore placed upon local blood-lettings in the situations just mentioned, on low diet or abstinence, and on the refrigerants and cooling diaphoretics already recommended. If the inflammation terminate in suppuration or abscess, poultices or fomentations, and as early an external outlet to the matter as can be given it, are requisite. When tenesmus is present, cupping over the sacrum, ipecacuanha with nitrate of potash and opium, in frequent doses, anodyne fomentations, and the treatment about to be prescribed for this symptom (§ 46.) are most serviceable. The bowels should be kept gently open by means of castor oil, the aperient electuaries, and other laxatives mentioned hereafter (§ 46. c.).

43. *F. Treatment of Ulcerations, Fissures or Cracks.* — *a.* When *ulcerations* form between the tumours, or on their surfaces, the parts should be carefully cleansed after each evacuation, and an ointment, with a small proportion of Peruvian balsam may be applied to it, by a pledget of lint; or any other ointment of an astringent and anodyne kind may be tried. The balsams or terebinthi-

nates should be given internally, in the form of pill, with magnesia, in quantity sufficient to keep the bowels gently open.

44. *b. Fissures or cracks* between the tumours are attended either by exquisite pain, or by spasmodic constriction of the sphincter. More frequently both these latter morbid states are present; and occasionally the patient is tolerably free from both. When the lesion is thus simple, the treatment recommended for ulceration will often be sufficient; the local application of borax dissolved in honey will also be of service, as a substitute for an ointment; but when either pain or spasm of the sphincter is complained of, other means are required. In these cases I have found the addition of the extract of *belladonna* to any of the ointments usually prescribed give almost immediate relief. If a large proportion of the extract be employed, the effects ought to be carefully watched. Due attention to the functions of digestion and of excretion, and to existing constitutional symptoms, is always necessary. In less severe cases of this description, the extract of *hyocyamus* may be tried, before having recourse to the *belladonna*. M. BOYER and most surgeons in this country have advised a complete division of the sphincter ani muscle for the removal of this complaint. I have treated five cases of fissured anus since 1822, when the first came under my care. In all these the operation had been recommended; and yet they perfectly recovered in a short time, and without a single exception, by means of a purely medical treatment. Strict injunctions as to diet and regimen; the daily evacuation of the bowels, and afterwards washing out the rectum by emollient injections; careful ablution of the external parts, and the application of an appropriate ointment or cerate with *belladonna*; attention to the functions of the digestive and assimilating organs, and to constitutional symptoms, and the removal of general or local plethora, constituted the treatment. The *belladonna* was added to various kinds of ointment, according to the peculiarities of the case. In all it affected the pupils, and in two, it produced its characteristic eruption on the skin. Several years after I first employed this medicine for fissure with painful spasm of the sphincter, the account of M. DUPUYTREN'S treatment of this affection by the same means appeared in the medical journals of Paris.

45. *G. Hemorrhoidal pains and spasmodic stricture of the rectum*, generally connected with fissure or ulceration at the bases of the tumours, must be treated in the manner just stated (§ 44.). The pains are often intermittent, but very acute, during their continuance. Sometimes they extend down to the feet and ankles, and even occasionally assume a neuralgic character in these or other parts of the lower extremities, or give rise to spasm in various parts, especially in nervous or hysterical females. Some interesting instances of such affections have been recorded by Sir B. C. BRODIE, and have been observed by myself. In such cases, much benefit will generally accrue from taking the *confectio piperis nigri*, twice or thrice daily; and from adopting the constitutional and local treatment just recommended. This medicine may also be conjoined with an anodyne, and the bowels regulated by the medicines already suggested. M. MONTÈGRE strongly ad-

vises having recourse to the "*douche ascendante*;" or the forcible dashing of cold water against the anus, and to cold injections. In order to render the evacuation more easy, he directs the lavement to be thrown up when the inclination to stool takes place. Emollient injections may also be tried, either to facilitate the discharge, or to cleanse the rectum afterwards; and *suppositories* with the *ceratum plumbi compositum*, and opium, or *stramonium*, or *belladonna*, or any other narcotic may be occasionally introduced into the rectum, and they will seldom fail of giving relief. Great care ought to be taken in the administration of narcotics in lavements in the treatment of this or any other state of the complaint as they are often rapidly absorbed into the circulation, from the rectum and colon, and without having undergone any change. I have known half a grain of the *belladonna*, in one case, and thirty drops of laudanum in another, produce the most serious effects. When, however, either of these, or any other narcotic is prescribed in an ointment, pomade, or suppository, no unpleasant results will follow.

46. *H. Tenesmus, strangury, and constipation* often depend upon the same pathological states.—*a. The tenesmus* is generally owing to inflammatory irritation and congestion of the inner coats of the rectum, conjoined with spasmodic action of the muscular tunic. It will, with few exceptions, be removed by the means just directed (§ 42. 45.). In less acute, or more obstinate cases, the *belladonna* plaster may be applied to the perineum or sacrum. Five or six grains of the extract of poppies, or one or two drachms of the syrup, may also be occasionally thrown into the rectum, with any tepid emollient enema; or a suppository of the kind just stated may sometimes be introduced.—*b. If strangury or dysuria* supervene, it is to be imputed to the extension of the affection of the rectum to the neck of the bladder, or to the prostrate and urethra; and it will generally be found that it will be removed or relieved by the treatment recommended for *tenesmus*.—*c. Constipation* also frequently proceeds from the same local changes as occasion *tenesmus* and *strangury*, and from tumours or enlarged and congested vessels obstructing the canal of the intestine. In either case, there is more or less obstacle to the passage of a consistent motion, and much pain attending it. If these symptoms be allowed to continue, the complaint will be aggravated; or they will give rise to still more serious changes. In removing them, the milder laxatives will be found more serviceable than active purgatives; but those which act also upon the liver should be selected. Mercurials aggravate and even bring on *tenesmus*, and therefore cannot be employed, with the exception of *hydrargyrum cum creta*. This may be taken in small doses at bed-time, with *ipeacacuanha* and *hyocyamus*, or with extract of *taraxacum*. Some one of the electuaries already prescribed (§ 38.), or the decoction of *taraxacum* with the subcarbonate of soda, or the tartrate of potash with tincture of senna and syrup of roses, or of senna may be given, and continued for some time. A Seidlitz powder taken about an hour before breakfast is also one of the best aperients in hemorrhoidal cases. A frequent recourse to warm lavements is injurious in this complaint, as they relax the parts, and solicit the circulation to them.

M. MONTÈGRE, whose authority in this matter is very high, advises the injection of cold water in preference, as it strengthens the bowel; but he directs no more than will fill the rectum (about half a pint) to be thrown up. In the more severe states of the disease, especially in cases of fissure, of spasm of the sphincter, and of painful evacuation, he considers the cold injection, every time that a motion is about to be passed, most beneficial.

47. *I. Re-establishment of Suppressed Hæmorrhoids.*—When the suppression or interruption of piles is followed by aggravation of some related complaint; or injures the general health; or threatens some important organ, as the lungs, brain, liver, &c., there ought to be no hesitation as to having recourse to means calculated to reproduce them. A gentleman of about fifty, residing near Russel Square, subject to returns of humoral asthma often passing into bronchitis, as well as to frequent attacks of hæmorrhoids, experienced great aggravation of the former, in 1835, after the latter had disappeared for some time. I directed him to be cupped, but he neglected to adopt my advice: I therefore prescribed a full dose of calomel and aloes, and repeated it in a few hours, with the view of restoring the suppressed piles. This had the desired effect; but severe inflammation of the tumours and strangury supervened, followed by an abscess between the prostrate and anus. This broke externally, and soon healed; and the patient has not been confined a day since. Another gentleman, between fifty and sixty, had experienced severe headaches from the non-appearance of the hæmorrhoidal discharge. He was advised, in 1829, when I saw him, to lose blood; to live abstemiously, and to relinquish malt liquors. The first only of these injunctions was complied with, and his complaints returned. The same advice was again given, and the purgatives formerly prescribed were changed to those which act more energetically on the rectum. The hæmorrhoids were reproduced, and the headaches disappeared. Such instances are, however, not at all uncommon. Unless in urgent cases, it will be preferable to attempt the restoration of piles by the more gentle means at first, as the exhibition of those which are most irritating, before the action of milder remedies is ascertained, may excite inflammatory action, of a very severe kind, and great distress, as in the case first adduced. A reference to the causes which commonly occasion the complaint will show the means most likely to reproduce it. The most appropriate, however, are pediluvia or semicupia; the hip-bath; the application of leeches to the anus; the use of purgatives which act especially on the rectum, as calomel and other mercurials in full doses; aloes, colocynth, rhubarb, sulphate of soda, &c.; warm injections; aloetic enemata, &c.

48. *K. Of Regimen and Prophylaxis.*—An abstemious regimen is required during the attack, and is even more necessary in the intervals; for it is chiefly by diet, and prudent conduct, at these times, that this complaint, and its contingent ills, are to be warded off. A temperate climate is best suited to persons liable to hæmorrhoids; but sudden vicissitudes of weather are unfavourable, and should be guarded against, by wearing flannel next the skin, and by warm clothing. Malt and spirituous liquors ought to be avoided; and tem-

perance in food and drink should be observed. Too warm and soft beds are improper; and sitting on soft warm cushions is still more so. Regularity in the hours of eating, sleeping, waking, and taking exercise, is generally of service, and when medicine is requisite, it should be such as will correct morbid action, increase scanty secretion and excretion, particularly of the biliary and mucous surfaces, and preserve the bowels regularly and gently open. Cold ablution of the anus, after each motion, and, if hæmorrhoidal tumours protrude, the careful sponging of them before they are returned, will not only remove disorder, but prevent its return, if continued without interruption in winter as well as in summer. Venereal excesses, the more violent mental emotions, and all the depressing passions, are injurious. Exercise in the open air, especially on horseback, is always of service if taken regularly, although rough-riding, especially by those who are not accustomed to it, is often a cause of the complaint. — (See also RECTUM — Diseases of.)

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HAIR—ALTERATIONS OF.

CLASSIF.—GENERAL PATHOLOGY.—*Symptomatology*; *Ætiology*:—SPECIAL PATHOLOGY, and THERAPEUTICS.

1. The hair being an appendage of the skin, and the natural covering of one of the most important parts of the body, material changes in its state or appearance are interesting to the medical practitioner, as furnishing indications of several pathological conditions. Nor is the growth or removal of the hair devoid of importance, especially in certain diseases, and in convalescence from dangerous maladies. The various alterations presented by the hair are rarely primary or idiopathic, and seldom even depend upon local changes merely; but are usually the more remote consequences of debility and chronic disorder of the digestive organs, frequently associated with superinduced affections of the skin and of the

pilous follicles, and occasionally also with general cachexia. In many instances where the hair undergoes a marked change, the nails likewise present more or less alteration.

2. I. EFFECTS OF REMOVING THE HAIR.—The consequences of removing the hair depends, 1st, upon the quantity of hair removed from, and left upon, the scalp; 2dly, upon the states of the system and of the circulation in the head at the time of removal. When a person is in good health at the time, little further results from cutting off the hair than headach, cold in the head, or earach, or sore throat. *M. Jourdan* states, that when the long hair worn by the soldiers in the revolutionary war was cut off in all the regiments, many complained of headachs of several weeks' continuance; but he was not aware of any fatal effect being produced. The removal of the hair in cases of inflammatory excitement of the brain, or in that sthenic state of vascular action which requires having recourse to cold applications or the cold affusion, can seldom be productive of injury, although it seems very doubtful if it be so beneficial as is very commonly supposed; but it is very different in other circumstances. In adynamic, nervous, low, or typhoid fevers, or in exanthematous fevers presenting these characters—and still more especially during early convalescence from these, the removal of a large quantity of the hair very close to the scalp sometimes aggravates the symptoms. During the advanced stages of these diseases, the circulation in the scalp, and the perspiration from it, are checked, and congestion, or even serous effusion, is either thereby favoured, or induced, or increased. Therefore, in these low states of action and of vital power, the hair should not be shaved or closely cut from the scalp, unless when a blister is about to be applied in this situation. During convalescence from these or other dangerous maladies, the early removal of the hair, particularly when long or thick, is not without risk. *SEGER*, *VASSAL*, *LANOIX*, *ALIBERT*, *JOURDAN*, and others, have met with dangerous and even with rapidly fatal effects from this measure. The risk from it is great in proportion to the quantity of hair removed, and of the perspiration proceeding from the scalp. I have seen, in several instances, ill effects follow the removal of long thick hair from the heads of delicate children and females. In children thus constituted, the hair should always be kept short; and, if it be allowed to become abundant, it ought not to be closely cut at once. Whenever much hair is removed, a warm covering to the scalp should be immediately substituted, and worn for some time afterwards. Persons strongly constituted, and taking regular exercise in the open air, may not experience any disorder from the neglect of this precaution; but the weak, or the exhausted, or convalescents, will generally suffer if they act contrary to this advice.

3. Persons in the habit of wearing long *beards*, have often been affected with rheumatic pains in the face, or with sore throat, upon shaving them off. In several cases of frequently recurring, or of chronic sore-throat, wearing the beard under the chin and upon the throat has prevented a return of this complaint.

4. On the other hand, the *removal of the hair*, or keeping it closely cut, is often productive of

good effects: I have seen it of service in headaches. Frequent cutting promotes the growth of the hair, and admits of the usual operations of brushing and combing acting more efficiently on the scalp. In cases requiring cold sponging, the shower-bath, &c., shortness of the hair is an advantage. MORGAGNI (*Epist. viii. Art. 7.*), GRIMAUD, RICHERAND, and others, have adduced instances of recovery from mania, headaches, and various nervous affections, by keeping the head closely shaved. Whether the hair has any influence or not in retarding the passage of positive electricity from the body, or in otherwise affecting the electro-motive or galvanic actions taking place in the system, it is difficult to determine; but it seems very probable that it has.

5. II. OF EXCESS OF HAIR.—*A. General excess of hair* is not often seen. I knew two persons whose bodies were so thickly covered with hair, excepting the parts of the face, hands, and feet, that are usually devoid of it, as nearly to prevent the skin from appearing through it. Both were remarkable for strength and endurance; and in both the hair was dark brown. Their joints were small, the muscles uncommonly developed, and the adipose and cellular tissues scanty.—*B. Partial excess of hair, or the growth of hair in unusual parts*—*Extraneous hair*—the *Trichosis hirsuties* of GOOD—is very common. The most frequent examples of it are in sterile women, who often have more or less of a beard after they pass the age of thirty. Since HIPPOCRATES, growth of the beard in females has been imputed to deficient menstruation; but there are very numerous exceptions to this. Dr. GOOD states that one of the most striking cases he ever observed was in a woman who was subject to excessive menstruation, and who died at forty. The growth of hair on the upper lip is sometimes seen in young, as well as in aged women; and, either on the chin chiefly, or on both the chin and upper lip, is often met with in females about or after the change of life, and occasionally even in those who have had several children.—*a. Tufts, or patches of hair*, in situations where none is generally seen, have been frequently met with. When the patches are small, they have been usually denominated *nævi pilares*, or hairy *nævi*. In rare instances, however, they have been remarkably large. Cases are adduced by RAYER, GRIVET, BICHAT, DUFOUR, and others, in which these patches covered a large portion of the surface of the body, were of a brownish hue, somewhat elevated above, and quite different from the colour of, the surrounding skin.

6. *b. The hair also, in its natural situations, may acquire a remarkable length.* This is not a rare occurrence as respects the hair of the head; but it is very seldom met with in other places. BRÜCKMANN saw the hair of the head reach the ground; and OTTO refers to an instance of the pubic hair of a female being an ell and a half long. The premature growth of hair in natural situations, as on the pubis, chest, &c., has been sometimes seen, especially in connection with the too early developement of the genital organs. Several instances of this kind are on record.

7. *c. The growth of hair on mucous membranes* has been met with in rare instances; in different parts of the digestive mucous surface (WALTHER, OTTO, VILLERME, &c.), of which various cases are referred to in the *Dictionary of Medical*

Sciences (vol. vii. p. 37. *et seq.*), in the gall-bladder (BICHAT), in the uterus and vagina, (MECKEL, &c.) and in the urinary bladder (CRUVEILHIER, &c.). But it is extremely doubtful that the hair was developed in some of the situations where it has been found, as no information, in most of the cases, is given as to its roots. It is more probable, therefore, that it was introduced from without, or had accidentally passed into these situations.

8. *d. The development of hair in the interior of cysts* is more common, and has been more accurately observed. These cysts have been most frequently found in the ovarium, in the substance of the uterus, below the skin, and in various other parts. They seldom contain hair only, but more frequently also fatty matter, bones, teeth, &c. The hair is sometimes attached to the interior of the cysts, but it is more frequently entirely detached. It would appear, from the observations of WARREN, TUMIATI, BOSCH, SCHACHER, MECKEL, and others, that it is formed from roots or bulbs, as in the skin; and that in consequence of an alteration in these, it often becomes entirely unconnected with the surface from which it was formed. The researches, however, of TYSON, MORAND, BICHAT, and CRUVEILHIER, do not confirm this view, as, in the cases they met with, the hair was not attached at one of its extremities, either to the cyst, or to the other matters which the cyst contained. From the circumstances of these cysts being found most commonly in the ovaries, their formation has been imputed to an imperfect or unaccomplished coition. The fact that they have been sometimes met with in the ovaria of females, who had not reached puberty, or in whom the hymen was unruptured, has been considered to militate against this mode of accounting for their formation. But this objection to the doctrine is not valid; as it merely shews the impossibility of complete coition having taken place, and is no proof that the act has not been attempted.

III. MORBID STATES OF THE HAIR.—CLASSIF.—6. *Class*, 3. *Order* (*Good*). IV. CLASS, IV. ORDER (*Author*).

9. *i. The hair of the head may become weak and slender, and may split at the extremities*—the *Trichosis distrix* of GOOD, or *forked Hair*. This is a very common affection, and depends upon a deficient action of the bulb of the hair, in consequence of debility, or impaired vital power, frequently connected with weakened digestion and assimilating function.

10. *ii. The hair is sometimes rigid, crisped, and hard.* It is then usually very short and rough, and harsh to the touch. This state seems to depend upon a deficient secretion of oily matter, by which the hair is covered and protected. It is more rarely *bristled*—*Trichosis setosa* of GOOD. This alteration is noticed also by PLENCK, but in a loose and unsatisfactory manner. Of the *crisped* and dry state of the hair, I have seen some instances; of the *bristled*, I have not known even of a single case.

11. *iii. The Treatment* of these states of the hair consists in frequent cutting, and in the use of the local applications advised for loss of hair (§ 32.), more particularly the ointment prescribed at that place. Attention should also be paid to the digestive, assimilating, and excreting functions; as

I have never seen either of those affections of the hair unconnected with disorder of these functions.

12. III. FELTING OR MATTING OF THE HAIR.—*False Plica*.—The long hair of persons, who have neglected it, frequently becomes felted, or inextricably interlaced. Females after long illnesses are subject to it, particularly in Poland, and other countries where cleanliness in respect to the head is so much neglected. It is somewhat favoured by a morbid secretion from the scalp, and is occasionally met with in connection with *porrigo favosa* and other chronic affections of this part. It has been particularly noticed by DAVIDSON, KREUZER, BOYER, GASC, and other writers on *Plica*, and been confounded by many authors with that disease. JOURDAN and RAYER have, however, pointed out the great differences between them. Felting of the hair occurs independently of any alteration of the hair itself or of its bulbs, and without the constitutional and local disorder ushering in or attending *plica*. (See § 34.)—The remedy for it is obvious.

IV. LOSS OF COLOUR OF THE HAIR.—SYN.

Canities; Πολιότης, πολίωσις, (from Πολος, white, hoary); *Trichosis poliosis*, Good; *Canitia*, Auct.

13. DEFIN. Hairs prematurely grey, hoary, or white.

14. i. HISTORY.—Loss of colour of the hair may be accidental, premature, or senile; and it may be partial or general. The hair begins to be grey first at its free extremities; but it often changes in that portion which is nearest the skin. This latter circumstance shows that the hair has been first secreted of its natural colour, and afterwards secreted grey or white, in consequence of an affection of its bulbs, and is frequently observed when the loss of colour has been preceded by *eczema*, or any other chronic affection of the scalp. Men usually begin to get grey about forty, many between thirty and forty, and some not until a more advanced age. The occurrence of gray hairs in persons under thirty is not rare; and I know two individuals, one a male, the other a female, considerably upwards of seventy, who have thick dark hair, without any being grey. The hair of the head is that which first loses its colour from age, the change usually commencing on the temples. The white hairs are at first few, but they soon multiply. When they fall out, they are seldom reproduced, so that baldness often follows canities. Females generally retain the colour of their hair longer than males, and the fair longer than the dark; but fair hair often falls out at an early age.

15. Canities, either partial or general, is very rarely congenital, or observed in childhood. The very fair, or almost white hair, with which fair children are sometimes born, is not the change under consideration. Greyness of parts only—in tufts—has been often noticed, and is owing to some affection of the scalp in those parts. This partial loss of colour may occur on the head, in the beard, or in other situations. Instances of this kind, and of the change taking place on one side only, have been recorded by LORRY, LUDWIG, HAGEDORN, RAYER, and others, and are by no means rare. Loss of colour of the hair commonly is gradual and slow; but in some cases the change has taken place in a few hours, or in the course of a single night. The case of Mary Queen of Scotland has been often adduced,

and others are mentioned by VOIGTEL, BICHAT, CASSAN, and RAYER. When hair grows from cicatrices without pigment, it is colourless. and in general or partial leucopathia, the hair is white or grey in most instances. In senile canities, however, the scalp seldom participates in the loss of colour.

16. ii. CAUSES.—A. The remote causes of premature canities are—disappointments, anxiety of mind, extreme or protracted grief; unexpected and unpleasant intelligence; fear, fright, or terror; great mental exertion; paroxysms of rage or anger; severe, repeated, or continued headaches; rheumatism of the head and toothach; the salts from the evaporation of salt-water from the hair; eczema and other chronic eruptions of the scalp; over indulgence of the sexual appetite; excessive hæmorrhage or other discharges, mercurial courses, and an hereditary predisposition.

17. B. Blanching of the hair appears to arise from a diminished secretion of the colouring matter by the bulbs or follicles. Dr. MACARTNEY thinks very justly that an organic action must be admitted to exist in the substance of the hair, in order to account for the changes to which it is subject, and which sometimes takes place so rapidly as otherwise not to admit of explanation. M. RAYER states, “that grey hairs have been said to be without marrow or matter in their interiors, in place of which there is an empty canal.” VIRTHOF says that the bulbs of those hairs which have become white are somewhat atrophied, and Dr. MACARTNEY thinks that the change is owing to the absorption of the colouring matter when it takes place rapidly.

18. iii. TREATMENT.—When canities is the result of age and of partial or general leucopathia, it cannot be made the subject of medical treatment. But when it is partial or depends upon chronic inflammation of the scalp having extended to the bulbs of the hair, the removal of this state, and of the white hairs, is sometimes followed by the production of hairs of the natural colour. Various means of dyeing the hair have been resorted to; but these are unworthy of notice. Applications to the hair, with the view of preventing it from becoming grey or falling off, have been frequently employed. Amongst these, the prepared marrow of the ox or deer, bears’ grease, honey-water, and substances mentioned hereafter (§ 32.), are most deserving notice.

V. PRETERNATURAL COLOUR OF THE HAIR.—

SYN. *Miscoloured Hair*; *Trichosis Decolor*, Good.

19. The hair may be changed from a very light to a very dark colour. Instances of this have been adduced by ALIBERT and others, and are not infrequent. It may be also changed to a reddish yellow, and even to green or blue. It has likewise been observed of a spotted or variegated hue; this, however, is not uncommon. Hair that has become grey has, in very rare cases, been changed to black. The instances in which the hair has been said to have been green or blue have most probably arisen from the action of metallic fumes on hair of a light colour. The subject is more fully discussed by M. RAYER, but it is not deserving of further notice.

VI. THE WANT OR LOSS OF HAIR.—SYN. *Alopecia*; Ἀλώπεια (from ἀλωπῆξ, a fox), Galen; *Area*, Celsus; *Gangrena Alopecia*, Young;

Alopekia, Swediaur; *Defluvium Capillorum*, Sennert; *Fluxus Capillorum*, Auct. var.; *Der Kahlkopf*, *Kahlheit*, Germ.; *Chauveté*, *Calvitie*, *Alopécie*, Fr.; *Calvezza*, Ital.; *Baldness*.

20. DEFIN. — *The defect or loss of hair either limited to one or more parts only, or diffused and more or less general.*

21. Alopecia may be *congenital*, and is then owing to the tardy development of the hair; which often does not appear until the end of the first or second year. This form of baldness is, however, very rarely permanent. If it is, the circumstance is to be imputed to the absence of the follicles.

22. Decay of the hair may take place in various states of the scalp and of the constitution. It may occur either prematurely, or as a consequence of age. In the former case it is the result of disease, and is either *limited* — partial, but complete, as far as it extends — or *diffused*, and more or less general: in the latter it is always *diffused*, and depends upon the change which the integuments of the body undergo at that period of life. I shall consider, *first*, limited or partial alopecia; and, *secondly*, diffused alopecia; this latter comprising, (a) Premature loss of hair, and (b) Decay of the hair from age.

i. LIMITED OR PARTIAL BALDNESS. — SYN. "Οφιασις; (from ὄφις, a serpent); *Ophiasis*, Celsus; *Area*, Auct. var.; *Alopecia Areata*, Sauvages; *Porrigio Decalvans*, Willan, Bateman; *Trichosis Area*, Good; *Alopecia partialis*, *Alopecia circumscripta*.

23. CHARACT. — *Bald patches often without decay or change of colour of the surrounding hair, the bared spots being shining and white, frequently spreading or coalescing.*

24. Partial alopecia is the consequence of various alterations of the secreting follicles of the hair induced by impetigo, fevers, chronic eczema, sycosis, &c. The variety described by WILLAN, under the name of *Porrigio decalvans*, is the most remarkable which comes under the present head. The scalp, or skin of the chin or cheeks of persons affected with it, presents one or more patches, frequently of a circular form, entirely devoid of hair, although surrounded by that of the natural growth. The skin of these patches is smooth, without redness, and unusually white; and their areas extend gradually. When several exist near each other, they ultimately unite. A large portion of the scalp may be thus denuded of hair. Neither vesicles nor pustules, nor any other kind of eruption can be detected in the surface of these patches. This affection occurs commonly in the hairy scalp, and in children; but it is not infrequent in adults, and in the beard. In children it often assumes an irregular serpentine or winding form. I have seen it in them associated with various disorders of the digestive organs, and occasionally with those of the brain; but it has also been apparently independent of any internal affection. Dr. ELLIOTSON has seen it in a child with disease of the brain (*Loñd. Med. Gaz.* vol. vii. p. 639. and v. viii. p. 30.) The cases which I have met with in adults were not connected with any other disorder. I agree with GOOD, RAYER, and TODD, in viewing it as a variety of alopecia, and entirely unconnected with porrigio.

25. A variety of partial alopecia has been noticed by MM. MAHON and RAYER, that differs from the preceding chiefly in the appearance of the affected surface, and in the presence of a few altered and brittle hairs. In this latter respect, it nearly approaches the morbid state of the hair already mentioned (§ 10.). On one or more circular patches, the hair seems broken off to within a line or two of the skin. The surface of the patches is dry, appears rough to the eye, and feels more so to the touch. It is slightly bluish, and a fine white powder can be detached from it. The affection begins at a point, and spreads; similar spots forming in the vicinity of the one which first appeared. These may extend until nearly all the scalp becomes affected.

ii. DIFFUSED ALOPECIA. — SYN. *Calvities*, *Depilatio*, *Defluvium Pilorum*, Auct. var.; *Trichosis Atherix*, Good.

26. CHARACT. — *The decay or fall of the hair occurring in a diffused or general manner; the hair becoming gradually thinner, commonly at first on the crown, or on the forehead and temples.*

27. Decay of the hair in a gradual and diffused manner may take place prematurely, and as a consequence of disorder of the digestive organs, or of the constitution, or of a local affection of the scalp extending to the pilous follicles. It is often an indication of premature exhaustion of organic nervous energy. — *Congenital absence*, or defective development of the hair of a permanent kind (§ 21.) has been rarely observed. Instances of it have been recorded by HEISTER, DANZ, WELLS, and RAYER. Premature loss of hair is not confined to the scalp, but often extends to the eye-brows, beard, and other parts of the body. It may be even general. Mr. SOUTH (*Translation of Otto's Pathology*, p. 120.) mentions a case most probably of this kind. A total loss of hair, however, is more common than general defective development of a permanent kind; and is met with chiefly in mature or far advanced age. J. P. FRANK saw it in a young man; and instances of its sudden occurrence are recorded by PAULINI, and HEISTER, and in the *Journal de Physique* (t. xiv.), and in the *Berlin Medical Transactions* (t. iii. p. 372). Most commonly the hair of the head, of the axillæ, and pubes, gradually and successively fall off. In rare instances the hair has been renewed of a finer quality, as in the cases recorded by LEMERY and BONIN (*Journ. des Progrès*, &c. t. xiv. p. 244.) A singular case of baldness confined to one side of the body is related by RAVATON.

28. CAUSES. — A. The remote causes of baldness are — 1st, Whatever debilitates and exhausts the system, as profuse or prolonged discharges; dangerous hæmorrhages; masturbation, or immoderate indulgence of the venereal appetite; low, typhoid or adynamic fevers; care and disappointments; the depressing passions and anxiety of mind; excessive application to study; the contact of rancid, septic, or putrid animal matters with the scalp; more rarely the syphilitic poison, and the frequent or prolonged use of mercury. It may also be caused by exposure to the sun's rays, by the fumes of quicksilver, by the friction of a military cap or helmet, by eczema or other chronic eruptions of the scalp, and by the use of tobacco. It has been said to be endemic in some places. LEO AFRICANUS has stated, that baldness is com-

mon in Barbary; T^CURNEFORT, that it is almost universal in Mycone, one of the Cyclades; and Sir R. SIBBALD that it was frequent in Shetland in his time, owing to the fish diet of the inhabitants. That living chiefly on fish, and on poor unwholesome food may aid in its production, is not improbable. The salts of sea-water left in the hair will sometimes cause it indirectly. Extreme distress of mind has produced a general loss of hair within twenty-four hours; but such instances are extremely rare. Since HIPPOCRATES, it has been said that eunuchs do not become bald; and SCHENCK remarks, that baldness does not commence, until after the generative functions are exercised. It is certainly much less frequent in females than in males.

29. HISTORY AND PATHOLOGY. — A. The fall of the hair may take place in a few days, or even in a shorter period; or so slowly as to escape observation. The skin of the denuded part usually presents the ordinary appearance, especially in senile alopecia. In some cases, it is pale, or of dead whitish colour, and furfuraceous; and occasionally it is covered by scurf, or scales, and is distinctly inflamed. In the former case, its sensibility is not materially altered; in the latter there are heat, itching, or pricking. The hair is often more or less altered before it falls out, being thin, harsh, dry, weak, and stunted, or deprived of colour. This is most frequently the case when it proceeds from causes acting directly on the scalp, and from chronic eruptions of this part.

30. B. Loss of the hair proceeds from changes in the bulbs: — 1st, From atrophy or wasting of the follicles, as in senile alopecia, and in that state of the affection which is produced by excessive venereal indulgences; — 2d, From an impaired or suspended vital action of the pilous follicles, as in the alopecia that takes place suddenly or rapidly from mental emotions, &c.; in that which follows malignant adynamic or putrid fevers; and in that variety which has generally been known by the name of porrigo decalvans, — and, 3d, From chronic inflammation, extending to the bulbs. Equally important with a knowledge of the particular condition of the follicles or bulbs to which the loss of hair is to be imputed, is the investigation of the affections with which it is related, or upon which it is dependent. Although alopecia is often a strictly *local* and *primary* affection, proceeding directly from local causes, yet it as frequently depends upon disorder of the digestive and assimilating organs, and upon the general state of the system. As Dr. T. J. TODD justly remarks, it may arise not only from a change primarily induced in the follicles, but also from the extension of disease to them from the tissues in which they are situate. In this latter case, the alopecia may be also *local*, but it is *consecutive*, the follicles being altered by becoming involved in the inflammation constituting an adjacent cutaneous disease. The baldness following eczema, porrigo, impetigo, &c. is an illustration of this.

31. C. Alopecia is most frequently *symptomatic* of debility or cachexia, produced by the exhausting causes enumerated above (§ 28.). After fevers, the hair is generally exfoliated with the cuticle, and sometimes even with the nails; but as the follicles have their vital actions restored, the hair is reproduced. When, however, the hair falls

out in phthisis, diabetes, and other cachectic maladies, no attempt at restoration takes place. Alopecia may also be symptomatic of chronic inflammation of the digestive mucous surface. Indeed, this is a frequent cause of it. The connection of this state of the digestive organs with chronic cutaneous eruptions is fully established and well known; and the pilous follicles are sometimes the parts of the integuments affected thus sympathetically; the affection implicating them either principally or solely, or in conjunction with other parts of the skin. This dependence upon, or connection with, derangement of the digestive and even of the biliary functions should never be overlooked in practice; for, although I cannot agree with BROUSSAIS and his followers, that the external change is produced by the internal inflammatory irritation, or that the internal complaint is so generally inflammatory in its nature as they would make it appear, yet I am convinced that there is a very close connection often existing between the internal and external affection; both affections generally proceeding from, and being associated by, the same pre-existent disorder; which disorder may generally be referred to the state of organic nervous function or power.

32. TREATMENT. — A. In *limited* or partial alopecia, more particularly that variety usually called porrigo decalvans, and in all those cases that appear independently of inflammatory action — that depend upon the first and second pathological states enumerated above (§ 30.) — stimulation of the parts, by the decoction of walnut-tree leaves, or of the leaves of the solanum, — by the infusion of rosemary, or of the lesser centaury, or of mustard seed, — by various spirituous and aromatic washes, — by ointments containing the tincture of cantharides, or some essential oils, — or by embrocations of thyme, lavender, the juice of onions, of garlic, &c., has been very generally recommended. M. RAYER, however, does not consider this practice very successful. Dr. WILLIS has seen the common mercurial ointment prove of service. The balsam of sulphur, applied to the scalp, is praised by RULAND; a solution of the sulphate of copper in spirits, by some recent writers, and blisters by ARNDT. I have seen a strong solution of the nitrate of silver, in some instances, and either an infusion of capsicum, or ointments with the tincture, in others, applied to the affected surface, and persisted in for some time, restore the hair. DUPUYTREN generally prescribed an ointment with a strong tincture of cantharides. I have, in several cases of baldness, of the kind under consideration, employed an ointment containing the balsam of Peru with complete success. It has the effect of rendering the hair thick and persistent, and in promoting the growth of it in parts from which it had fallen out from impaired action of the follicles. The following is the formula that I have usually employed.

No. 244. R. Adipis Præparatæ 3ij.; Cerae Albæ 3ss.; lento igne simul liquefac, tum ab igne remove, et, ubi primum lentescant, Balsami Peruviani veri 3ij.; Olei Lavandulæ M xij. adjice, et assiduè move donec refriguerint.

33. When alopecia proceeds from eczema, impetigo, fevers, &c., the treatment should be entirely directed to the removal of these eruptions. When this is accomplished, and the skin remains dry, tense, or furfuraceous, the part should

be shaved, and the surface anointed with the above ointment, or with some substance of a similar nature, as an ointment with the oil of mace, &c. The tincture or infusion of tobacco, as recommended by ZACUTUS LUSITANUS, and often empirically resorted to, will also be of service in this and in some other states of the disorder. In every form of the affection, the digestive, assimilating and excreting functions should be regulated or assisted; and associated internal congestions, or inflammatory irritations removed by appropriate means. Alopecia, as well as premature greyness of the hair, is often caused by disorder of these functions, and associated with these internal diseases; and neither the one nor the other can even be retarded in their progress, unless the treatment be directed with a strict reference to these pathological connections.

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VII. TRICHOMATOSE HAIR. — SYN. *Τρίχωμα*, *Plica Polonica*, *Plica Polonica Judaica*, Auct. var.; *Plica Saxonica*, Linneus, Vogel; *Plica Belgarum*, Schenck; *Trichoma*, Manget, Sauvages, Cullen; *Lues Sarmatica*, L. Polonica, L. Trichomatica, Auct.; *Tricæ*, *Tricæ incuborum*, T. Scroforum; *Cirragra*, C. Pollonorum; *Affectio Sarmatica*; *Helotis*, Agricola; *Ecphyma trichoma*, Young; *Trichosis Plica*, Good; *Plica*, Rayer; *Plica Cachectica*, Author; *Weichselzopf*, *Ludenzopf*, Germ.; *Gwozdziec*, Pol.; *Plique*, P. Polonaise, Fr.; *Plica Polonica*, Ital.; *Plicose Hair*, *Felted Hair*, *Cachectic Plica*.

CLASSIF. — 3. Class, 3. Order (Cullen). 6. Class, 3. Order (Good). IV. CLASS, IV. ORDER (Author).

34. DEFIN. — *The hair thickened, softened, felted, and agglutinated by a morbid secretion from their bulbs and from the scalp.*

35. The anomalous development and agglutination of the hair, occasionally observed in Poland, and more rarely in some adjoining countries, and peculiar to them, has attracted much attention during the two last centuries. It frequently appears in the course of some acute or febrile disease, or of some chronic internal complaint; but it also occurs, although more rarely, as the primary or principal malady. Hence it has been considered by some writers as an idiopathic disorder, but by others, and very recently by Dr. MARCINKOWSKI and BRIÈRE DE BOISMONT, who had frequently seen it in Poland, chiefly as a contingent critical affection.

36. i. DESCRIPTION. — After an attack of acute fever, characterised by languor, pains in the limbs and head, vertigo, an invincible disposition to sleep, rushing noises in the ears, pains in the orbits, injection of the conjunctiva, coryza, and sometimes clammy sweats, indications of plica are sometimes observed. Occasionally the febrile disorder is attended by redness of, or by an eruption on the skin, and an offensive perspiration. M. LEBRUN and the writers just named state, that it may occur in the course of any acute or chronic affection of the brain, or of the viscera of the chest or abdomen; and that, although it often is observed in the young and robust, it always is preceded and attended by more or less febrile or internal disease. Hence the remarkable differences in the descriptions of the constitutional symptoms attending it, as furnished by most authors; and hence the reason for viewing it as proceeding from a cachectic state of the constitution developed by these complaints, and by the peculiar habits and circumstances of those attacked by it. According to this, the opinion of Drs. MARCINKOWSKI and BRIÈRE DE BOISMONT, that it is generally *critical*, and should be treated by means directed to the primary disorder, will appear perfectly rational. M. JOURDAN and others contend that it is both primary or *idiopathic*, and *critical*; and that in the first form it appears suddenly or in a short time, attended by severe pains, resembling those of rheumatism or gout; in the second, it supervenes slowly, in the advanced course of various affections different in nature and character, but generally accompanied with viscous perspirations of the head. The scalp is most commonly or chiefly affected; but the hair in other situations and the nails are frequently also implicated.

37. The scalp is sore to the touch, excessively sensible and itchy; a clammy offensive sweat exudes from it, and agglutinates the hair, which loses its lustre and appears thickened, softened or distended by a glutinous fluid of a reddish or brownish colour. This fluid is produced at the extremities of the bulbs, and is transmitted to the ends of the hair. A peculiar offensive smell attends this exudation from the hair and scalp. The hair is matted or agglutinated in different ways — sometimes in single locks, of various thickness and length, resembling ropes — *male plica* — *plica multiformis*. Occasionally the hair is stuck together in one mass or cue. *Plica caudiformis*; and in other instances it is felt into a mass or cake, of various sizes — *Female plica*. The hair of the beard, pubis, and axillæ, may also present similar appearances. When thus diseased, the hair often acquires a great length. Instances of its reaching the length of some yards are adduced by the writers referred to at the end of this article. Professor KALTSCHMIDT possesses the pubes of a female, the hair of which may have readily reached round the body. The surface of the scalp is often covered with superficial ulcerations, or with incrustations formed by the morbid exudation; and numbers of *pediculi* are frequently seen in this and in other parts of the body. The nails of the hands and feet commonly become long, hooked, yellowish, livid or black.

38. MECKEL injected the scalps of two persons who died with plica, but none of the injection reached the bulbs of the hair. J. FRANK and LA FONTAINE found the hair-bulbs much enlarged, and full of a yellowish glutinous fluid; GILBERT also observed them distended by a dark fetid matter. SCHLEGEL states that the hairs are enlarged, and filled with a yellowish brown fluid; and ROLFINCH and VICAT say that they are so frequently distended with this fluid as to burst, and to discharge it externally. Similar changes have been observed by GASC and others. M. BLANDIN remarked the bulbs to rise above the level of the skin, within the infundibuliform cavity of the root of the hair, as the papilla or bulb of the feather elongates and produces the quill in the young bird (RAYER). M. SEDILLOT found, on examining trichomatous hair with a microscope, the internal canals much larger than in healthy hair, and the cellular cavities near the canal much more distinct than usual. That the hair neither bleeds when divided, nor is sensible, has been shown by BOYER and others. The morbid sensibility attending the complaint is seated in the scalp and hair-bulbs.

39. ii. CAUSES. — Plica is said to have first appeared in Poland near the end of the thirteenth century. The earliest writers on the disease speak of it as well known. It is now wearing out. It has always been more frequent on the banks of the Vistula and Borysthenes, and in damp and marshy places, than in other parts of Poland. Very rare instances of it have been met with in Holland, Saxony, and some other places in Germany. Its endemic origin seems well established. LA FONTAINE states that, in the provinces of Cracow and Sandomir, plica affects the peasantry, beggars, and Jews, in the proportion of two thirds in ten; the upper classes in that of two in thirty or forty. In Warsaw and the vicinity, it attacks four out of

forty or forty-five of the former class; and three out of ninety or a hundred of the latter. He assigns the same proportions to Lithuania as to Warsaw, and the same to Volhynia and the Ukraine as to Cracow. SCHLEGEL, GASC, HARTMANN, and other recent writers, consider that the disease is not nearly so frequent as here stated. This malady appears in the human species primarily; and it is said also to affect the lower animals; but there has been no proof adduced of its transmission from the former to the latter. It has been supposed to be contagious, but this opinion has been shown to have been unfounded.

40. a. Amongst the *remote causes* of plica, wearing the hair long and applying to it oils and ointments, often rancid (GILBERT); neglect of personal cleanliness; keeping the head warm or covered with thick woollen or fur caps; using heating aromatic substances to the head, and covering it with warm applications and dresses with the view of procuring a critical discharge from it, especially in rheumatic or other diseases of this part, are the most influential. SCHLEGEL imputes plica chiefly to the use of semi-putrid fish, and damp residences; and doubtless these often concur with the foregoing in predisposing to, or in exciting, the affection.

41. b. M. JOURDAN considers this complaint, in respect of *its nature*, to consist of an increase of the vital functions of the bulbs of the hair and of their secretions, with augmented sensibility. BALDINGER imputes it to rheumatic acrimony, attended by an increased secretion from the bulbs. FRANCK, WOLFRAMM and LARREY view it as a consequence of, or as connected with, secondary syphilis; and many of the writers referred to, as a critical discharge, determined to the hairy scalp, by the concurrence of several of the causes just enumerated. By most of the authors, however, who have closely watched this affection, it has been considered as *sui generis*, and as seated essentially in the bulbs of the hair. SCHLEGEL, LA FONTAINE, ROBIN, CHAUMETON, MOUTON, and numerous others have shown, that it is not a product of neglect or dirt, otherwise it would have been seen in other countries as well as in Poland; that the bulbs of the hair exude a peculiar viscid secretion which may be seen issuing from them when the morbid hair is removed; that they are found swollen and acutely sensible; that it is often attended by a similar change in the nails; that it is frequently a marked crisis of other maladies; and that it cannot be quickly removed without danger. Much of the difference of opinion as to the origin and nature of plica, and as to the consequence of removing it, has arisen from confounding the false (§ 12.) with the true disease.

42. iii. DIAGNOSIS. — The precursory and characteristic symptoms are such as readily distinguish true plica, from the false or the felting of the hair caused by neglect of cleanliness, &c. and from every other affection. The agglutination of the hair by a nauseous exudation from its roots, the enlargements of the bulbs, the swelling and softening of the hair itself, and the attendant alteration of the nails, are peculiar to this complaint.

43. iv. TREATMENT. — The occurrence of plica in persons affected with various serious diseases has sometimes proved beneficial. In such cases

it should not be interfered with, until the agglutinated mass is pushed at some distance from the skin by the growth of healthy hair. When plica is left to itself, the febrile and other symptoms very frequently disappear of themselves. After several months, or a year, or even longer, the morbid exudation decreases or entirely ceases; and as an effect of the growth of hair, the diseased portion is removed to a distance from the surface. It is only then that the Polish physicians recommend the hair to be cut. SCHLEGEL, LA FONTAINE, HARTMANN, MOUTON, and other experienced writers contend that the removal of the diseased hair before this time has been followed by amaurosis, palsy, convulsions, epilepsy, apoplexy, and even by death. Warned by these consequences, and considering the exudation from the scalp and pilous bulbs as a poison—"virus trichomaticus"—the expulsion of which from the system is essential to recovery, the Polish physicians frequently carry the principle of non-interference to an injurious length. At the same time, it must be admitted that a premature removal of the diseased hair and suppression of the morbid exudation is very likely to prove injurious upon the principles stated above, and insisted upon in various parts of this work; especially if such interference be not attended, and its consequences not prevented, by the exhibition of means which will eliminate effete or morbid matters from the circulation, by increasing the functions of other emunctories, particularly of the intestinal canal, kidneys, and skin. If, therefore, the hair become dry and sound at its roots, the best informed observers agree in removing it, the head being kept moderately warm afterwards; but, as long as the bulbs continue inflamed, morbidly sensible, and exude a viscid fluid, other means of cure should be prescribed. What these means, however, are, is a matter that has not yet been fully shown; and certainly the internal remedies recommended by most of the writers on plica are but little calculated to remove the morbid conditions on which it depends.

44. The marked disorder of the digestive and excretory organs, acknowledged to attend or precede the appearance of plica, although never viewed in sufficiently close connection with its causation, indicates the propriety of directing at least a part of the means of cure to these organs. The antecedent pica, and the morbid states of all the secretions and excretions, show the propriety of having recourse to purgatives—cholagogue, deobstruent, stomachic, and others, according to circumstances—in the treatment. It is to the general neglect, in Poland especially, of these and of other evacuations, in the early stages of acute and chronic maladies, that the occurrence of this affection is, in my opinion, chiefly to be attributed. That purgatives are of service in plica is shown by the admission of the good effects resulting from them, by HUFELAND, DE LA FONTAINE, and KÜSTER. From the manner in which the means of cure have been recommended in works on plica, it is very obvious that most of them are employed altogether empirically. The *Lycopodium clavatum* is much used both externally and internally, but some writers consider it inert. Various preparations of mercury, antimony, sulphur, zinc, &c., have been employed; and emetics, diaphoretics, anodynes, narcotics,

have severally been insisted upon. It is obvious that these may be either serviceable or injurious according to the circumstances of the case, and the manner of prescribing them. DE LA FONTAINE and KÜSTER prefer sulphur and antimony, and their combinations, especially the golden sulphuret of antimony. J. FRANCK praises sulphur and conium. For the debilitated and aged, it is obvious that tonics, or a combination of tonics and aperients, are necessary. Personal cleanliness, warm baths, and suitable diet, are also requisite.

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HEADACH.—*SYN.* κεφαλαλγία (from κεφαλή, the head, and ἀλγέω, I suffer pain); κεφαλαία, ἡμικρανία, (from ἡμι, half, and κρανιον, the skull). Cephalalgia, Cephalæa, Hemicrania, Auct. Lat. var. Dolor Capitis, Sennert, &c. Dolor Cephalicus, Hoffmann. Cupiple-nium, Baglivi. Gravedo Capitis, Carebaria, Καρφαρία (from καρη, the head, and βαρυς, heavy), Podagra capitis, Clavus, Clavus Hystericus. Mal de Tête, Céphalalgie, Migraine, Fr. Kopfschmerz, Hauptwehe, Germ. Mal

di Capo, Cefalea, Ital. Pain in the Head, Me-grim.

CLASSIF.—4. Class, 4. Order (Good).

IV. CLASS, III. ORDER (Author).

1. DEFIN.—*Pain in the head, with intolerance of sound, sometimes also of light, and incapability of mental exertion.*

2. Headach has too generally been referred to disorders of those viscera of the abdomen with which the head sympathises, even when manifestly proceeding from morbid states of parts enclosed by the cranial bones. It should, however, be recollected that the primary affections of which headach has been viewed as a symptom merely, much more frequently exist without, than with, this attendant; and that, when thus accompanied, some pre-existent or contemporaneous affection of the head is often actually present, either independently, or as an intimately related complication, of these reputed primary disorders, and is only aggravated or rendered more manifest by them. Besides—and the circumstance cannot be too strongly impressed upon the young practitioner—those very disorders so generally considered the source of headach are not infrequently produced by an affection of the brain; for, pain of the head, although a common symptom of it, is neither universally nor constantly present, but is very frequently altogether wanting at an early or an advanced period; so that disease of the brain itself may in the first place disorder the digestive or other functions, this disorder reacting upon the brain, or on the nerves more immediately related to it, and exciting or otherwise altering their sensibility, so as to give rise to headach and other symptoms actually depending upon the brain, although developed and rendered manifest by the sympathetic disturbance of the digestive organs. When this takes place, the means of cure directed to the supposed primary disorder, but really to the symptomatic affection, by removing it, and by modifying the current of the circulation, frequently relieves the disease of the brain as far as morbid sensibility is concerned; and the relief is more or less complete or permanent, according as the prescribed means affect both the symptomatic and the primary disorder. That secondary or sympathetic affections are often thus mistaken for the primary will be manifest to every experienced and acute practitioner upon reading Dr. WARREN's paper on headachs; for many of the symptoms he has enumerated, as indicative of primary disorder of the stomach and intestines, are often either dependant upon the state of the circulation within the head, or associated with an affection of this part, and are resulting phenomena of previous disorder of the organic nervous system.

3. The dependence of disorder of the digestive organs and of the altered sensibility of the head upon the state of organic nervous influence has been overlooked by pathologists, owing to the brain having been generally, but erroneously, viewed as the source of nervous and vital energy, and to the dominion which the stomach has been supposed to exercise over the functions of other organs, through the medium of the brain. But it has been shown in another place (see art. DEBILITY, DISEASE, &c.), that the brain performs other offices than that of generating organic, nervous, or vital power; that it is enabled to perform its appro-

priate offices by the vital influence it derives from the organic nervous system; and that the stomach is dependent upon the same source as the brain for the discharge of its functions. Instead, therefore, of considering headach to proceed so frequently from disorder of the digestive organs as some recent writers suppose, I view both the one affection and the other as often associated phenomena resulting from other morbid conditions; and whilst I grant that it sometimes arises from that source, I contend that it then appears as a contingent phenomenon only, for when one part of the circle of organic nervous influence is disturbed, other parts frequently become also disordered, as hereditary constitution, previous disease, latent vice, or habits of life, may have predisposed particular organs or structures. Moreover, it seems extremely probable, that various morbid states of parts contained within the cranium are indicated by pain, before they have proceeded so far as to induce change of structure, or even without occasioning this result. The existence of altered sensibility of the ganglial nerves distributed to the head may be admitted, without any very evident alteration of the parts they supply being thereby induced. Observation has proved that the degree of pain is no index to the danger or extent of disease, as the most severe headachs are often unattended by any other evidence of organic lesion; whilst the most extensive disorganisation is frequently accompanied by little or no headach.

4. From this it will appear, that headach should be viewed as a symptom of disorder within the cranium, although not of altered structure, more frequently than it usually is; that it should be oftener assigned to a change in the organic nervous energy and sensibility in this situation; and, consequently, that it is oftener a primary disorder, than it has been generally considered. In treating, therefore, of headachs, I shall view them with strict reference to pathological states. Some of these states are such as do not admit of the headachs they produce being viewed otherwise than as symptoms; but others allow a nearer approach to a primary or idiopathic form, especially where local or general causes of exhaustion or depression occasion the complaint.

5. When called to a person suffering, or liable to, severe headach, the rational practitioner is led to inquire as to the *causes* and *seat* of pain, and as to its *nature*. But these are amongst the most difficult points to determine in practical medicine. The *causes* are most numerous and diversified; and yet they have a more or less intimate relation to the kind or form of the pain that results. The *seat* of pain is determined with great difficulty even when it admits of recognition, and, in many cases, it is impossible to ascertain it with any degree of precision. In order to arrive at a just conclusion, a number of circumstances—the history of the case with its causes and progress, the existing symptoms, and more especially those which more directly relate to the functions of digestion and excretion, and to perception, sensation, and locomotion, must be carefully observed and cautiously estimated. When the external or superficial parts of the head are chiefly affected, the exact *seat* and *nature* of the disorder are sometimes manifest.

But even in this case, the external affection may be only the consequence of previous disease of internal parts, the exact nature or seat of which can be only surmised in many instances. Disease of the membranes is generally attended by pain; but when it is chronic, and even when acute, if pressure of the brain is caused by it, no headach may be felt. When the more internal parts, especially the fibrous or medullary structure, are altered, pain is only an occasional symptom. Indeed, whenever the substance of the brain is chiefly affected, the pain should be ascribed rather to those parts of the membranes, or of the ganglial nerves supplying the brain, that had become implicated in the disease, than to the brain itself. Although it is the brain that feels alteration of sensibility induced in morbid parts, yet its own sensibility is so obscure, or so deficient, as seldom to be either excited or perverted when itself is the seat of lesion. Besides this, when the disease of the brain is attended by pain, the pain is rarely referred to the internal parts of the head, but either to some superficial situation, or to the head generally, in a confused or indistinct manner; or to some more or less distant part having an intimate nervous connection with the seat of disease.

6. The difficulty of ascertaining the *nature* of headach cannot be considered so great as that of determining the seat of it. Indeed it is often from inferences as to the nature of headach, that we are enabled to form any notion of its seat. A careful inquiry into the causes of the pain in every case, and a due estimate of the constitution, habits of life, previous ailments, and existing state of the patient, will generally enable the physician to determine as to which of the different forms of the complaint, into which I have divided it, individual cases belong. The *kind* of pain especially should be inquired into with the utmost precision. Its severity, its character, the state of the senses, and of the general sensibility, the temperature of the scalp, &c. ought to be ascertained. The *pain* may be either slight or intense, or characterised as heavy, dull, indistinct, diffused, numbing, compressive, constrictive, tensive, acute, burning, rending or bursting, or splitting, darting, lancinating, plunging, cutting, tearing, gnawing, boring, pulsating, or throbbing, &c.; but whichever of these may exist, the mode of its accession and subsidence; its duration, remissions, and exacerbations; the circumstances alleviating or aggravating it, the extent and situation of it, and its connection with affections of sight — with noises in the ears — the character of these noises — and with derangements of sensation, touch, and muscular action, in any part of the body — ought to be carefully remarked. The state of the mental operations, of the articulation, and of sleep in respect both to its manner and duration, should also receive attention. It is only from a careful estimate of these circumstances — of all the functions depending upon the cerebro-spinal system in connection with the state of the digestive, excreting, and circulating functions — that a correct opinion as to the nature of headach can be formed. There is no disorder which tries the science, experience, powers of observation, and acumen of the physician, more than this does, and there is none that requires a more precise

estimate of the pathological conditions on which it depends, as a basis for safe and successful indications of cure. From this it will appear, that a comprehensive division of the varieties of headach, without being either complicated or unnecessarily minute, is requisite to the due consideration of so important a subject as this.

7. SAUVAGES divides headach into three *species*: — *Cephalalgia*, or acute headach; *Cephalæa*, or chronic headach; and *Hemicrania*, or [partial or local headach. Under the *first* he enumerates the following *varieties*: the *plethoric*, *catamenial*, *hæmorrhoidal*, *dyspeptic*, *febrile*, *throbbing*, *intermittent*, *puerperal*, *inflammatory*, *catarrhal*, *nervous*, *hysterical*, and the *metallic*. Under the *second species*, he adduces the *syphilitic*, *scorbutic*, *arthritic*, *remittent*, *melancholic*, the *Polish*, or *plicose*, and the *serous*. Under the *third*, pains of the *eyes* and *sockets*, in the *frontal sinuses*, and the *catarrhal* and *hysterical*, *hæmorrhoidal*, *purulent*, *nephralgic*, and the *lunatic hemicrania*. It is obvious that this enumeration is deserving of attention, only in as far as it shows the symptomatic states of the disease. SAGAR adopts the division of SAUVAGES without any material alteration. J. FRANK also follows it partially, and enumerates *four species*, viz. *Cephalalgia*, *Cephalæa*, *Hemicrania*, and *Clavus*. He considers that headachs, in respect of their *nature*, may be further divided into *inflammatory*, *rheumatic*, *gastric*, *arthritic*, *scorbutic*, *periodic*, *scrofulous*, *carcinomatous*, *syphilitic*, and *nervous*.

8. Dr. GOOD has taken a very superficial view of the pathology of headach, and the surgical Editor of his work has added nothing to the text. He divides headachs into the *stupid*, *chronic*, *throbbing*, and the *sick*, and *megrim*. Every practitioner of experience must have met with, if he have not actually experienced in his own person, headachs which at one and the same time possessed all the characters Dr. GOOD has enumerated as marking distinct species. Dr. BURDER has given a more correct division of the complaint, but it is deficient in some important particulars. The *varieties* according to him are — *muscular*, *periosteal*, *congestive*, *organic*, *dyspeptic*, and *periodic headach*. Dr. WEATHERHEAD divides headachs into *dyspeptic*, *nervous*, *plethoric*, *rheumatic*, *arthritic*, and *organic*. The division adopted by SAUVAGES is complicated, and, notwithstanding its apparent minuteness, deficient. The arrangements of recent writers are even still more defective.

9. The several varieties of headach will be more advantageously considered according to the following arrangement: — 1st, The *nervous* — from depression or exhaustion; — 2d, The *congestive*, from impeded circulation in the brain or its membranes; — 3d, The *plethoric* and *inflammatory*, from general plethora, active determination of blood to the head, or inflammatory action; — 4th, The *dyspeptic* and *bilious*, from disorder of the stomach, liver, or bowels; — 5th, The *cerebral*, from organic change within the cranium; — 6th, The *pericranial*, from disease of the pericranium, or bones of the cranium; — 7th, The *hemicranical* or *limited*, confined to a spot, or neuralgic; — 8th, The *rheumatic* and *arthritic*; — 9th, The *periodic*; — 10th, The *hypochondrical*; — and, 11th, The

sympathetic, from disorder of the uterine and urinary organs.

10. i. NERVOUS HEADACH. — *A. Causes.*

— *a.* This *variety* is mostly frequent in females, in persons of the nervous temperament, and in those possessing high susceptibility, and delicate constitutions. Venereal excesses, masturbation, intestinal worms, the abuse of calomel or other mercurials, and whatever depresses or exhausts nervous or vital energy, *predispose* to it. — *b.* It is often *excited* by exposure to cold, or to cold and humidity conjoined; by northerly or easterly winds; by the more extreme electrical states of the air, or by sudden vicissitudes of these states; by prolonged or excessive lactation; by losses of blood, menorrhagia, leucorrhœa, or other discharges; by low diet and prolonged fasting; by the depressing passions, alarm, fear, grief, and anxiety of mind; by want of sleep, or inordinate mental or physical exertion; by the improper use of mercury or other depressants, as tobacco, digitalis, &c.; by various odours or mephitic vapours or gases; and by the impure air of crowded or insufficiently ventilated rooms. Sleeping in apartments containing plants in flower, the fumes of burning charcoal, or of turpentine, and recently painted rooms not infrequently cause it. The irritation of adjoining parts, as caries of the teeth and disease of their fangs sometimes also occasion it, especially on the same side of the head as the seat of irritation. I have seen the most intense state of this affection produced by the injudicious application of cold to the head, by too copious depletion, by floodings, and by a residence in low, cold, and humid localities. Nervous headach is common to females during the catamenia, especially when excessive or too frequent. It is often, also, indirectly caused by intoxicating liquors. HEINIMANN very justly notices it, as a not infrequent attendant upon *general anæmia*, resulting from disease or improper treatment. I believe that some degree of *celebral anæmia* very often attends, if it does not produce, this variety of headach.

11. *B.* Nervous headach is often sudden in its attack and termination; is frequently acute, excruciating, lancinating or darting; sometimes constrictive, or attended by a sensation of the temples being pressed together; occasionally accompanied with vertigo, a feeling of sinking and dread of falling, or with great nervous agitation or restlessness, and sometimes confined or limited to a narrow space. The patient is incapable of thought and of physical and mental exertion. The sight is often dim or impaired; dark spots or meshes moving before the eyes. In some instances the eyes become sunk, and the countenance depressed or collapsed. The pulse is small, occasionally frequent, but generally languid, and always compressible. The pulsation of the carotids is small or weak. The head is cool, and the face more pallid than natural. The stomach is liable to disorder, especially to acidity and flatulence, and the bowels are often costive. This headach is frequently worse in the morning and through the day, and abates in the evening. During severe attacks, wakefulness, dizziness, loss of memory, general susceptibility of the nervous system, &c. are usually complained of.

12. ii. CONGESTIVE HEADACH. — The state of the circulation within the head; the manner in which

the blood is returned from the brain; the partial protection of the parts contained in the cranium from the physical influences exerted upon the rest of the general surface; and the periodical changes in the position of the head, and in the exercise of the functions of the brain, would seem, on a superficial view, to favour the occurrence of congestion in this part. Yet, if these circumstances be more closely contemplated, there is at least equal evidence, that they essentially tend to preserve the brain from passive congestion on the one hand, and inflammatory determination on the other, as well as from the more serious contingencies consequent upon that minute division of the extreme vessels required for the exercise of the various cerebral functions. The congestion occasioning this form of headach is seldom general, but commonly limited to, or seated chiefly in, one hemisphere or lobe of the brain, or one or more lobes, either in their vertical or basilar aspect.

13. *A. Causes.* — Congestive headach is produced by pre-existent disorder, especially by repeated attacks of nervous or dyspeptic headach, and of active determination of blood to the brain. It often follows adynamic fevers, phrenitis, congestions of the lungs, and impeded circulation through the heart; and it is not infrequently caused by the circumstances that sometimes give rise to nervous headach, particularly the depressing passions, cold and humidity, miasmata, noxious gases, mephitic vapours, and crowded rooms. The use of opium, belladonna, aconitum, and other narcotics, occasionally also produces it, especially in certain idiosyncrasies, or in large doses. Tight neckcloths, stooping, and a too low position of the head during sleep, also occasion it. The headachs following the inordinate use of intoxicating liquors are to be referred to this and the preceding variety, rather than to disorder of the digestive organs or any other pathological state. Prolonged or intense mental occupation often gives rise to congestive headach; the repeated or continued determination of blood to the brain, thereby produced, passing into congestion, owing to exhaustion of nervous power; and this state, if allowed to continue, or frequently produced, often terminates in apoplexy or palsy. This variety is most frequently observed in persons advanced in life, and in those who have exhausted their vital energies and injured their constitutions by dissipation or intemperance.

14. *B.* The most *characteristic symptoms* of this variety are — the dull, grievative pain, and sense of weight in the head; frequently stupor, heaviness, or giddiness; dimness of sight; buzzing, ringing, or humming noises in the ears; and heaviness or pallor of the countenance. The pain is often referred to one part of the head chiefly, probably owing to the congestion being greater in one part than in another (§ 12.). The patient experiences great increase of vertigo when looking up, or when stooping or looking down from an eminence; he sometimes complains of a sense of coldness in the head, of fatigue or prostration of strength, coldness of the extremities, and of susceptibility of the nervous system. Sleep is often sound, heavy or snoring; occasionally it is disturbed or restless, and attended by dreams, or by convulsive movements. The spirits are depressed, or almost hypochondriacal. The pulse is languid, weak, or small, occasionally accele-

rated. The bowels are torpid, and the biliary secretion deficient or morbid. The urine is loaded, and deposits a copious sediment.

15. iii. HEADACH FROM PLETHORA AND INCREASED VASCULAR DETERMINATION OR ACTION.—

A. The predisposing causes of this variety are — the earlier and middle periods of life, the male sex, plethoric habits of body, sanguineous and irritable temperaments, full living, indolence, indulgence in bed, neglect of regular exercise in the open air, and mental exertion.—*B.* The exciting causes are — all the circumstances which either increase the vascular plethora resulting from the predisposing causes, or determine an increased flow of blood towards the head, especially, neglect of accustomed depletions; the suppression of discharges and eruptions, particularly of epistaxis, the catamenia, and hæmorrhoids; exposure to the sun; intemperance in eating or drinking; premature or inordinate mental culture, and exercise of the intellectual powers; every kind of mental excitement, fits of passion; the supine posture with the head low; wearing strait corsets; too long hair, or the removal of it; overheated or overcrowded rooms or assemblies; prolonged or unaccustomed continence, and the causes usually occasioning inflammation of the brain or of its membranes, or determination of blood to these parts. (See art. BRAIN, § 182.)

16. *C.* The *Symptoms* in this variety sufficiently indicate the cause of the headach; but they differ very much in different habits, temperaments, and ages.—*a.* In young persons, the pulse is strong, or full, somewhat accelerated; the head is hot, the countenance flushed, the eyes more or less suffused and heavy; and the pain is rending, severe, sometimes pulsative or throbbing, occasionally with a beating noise in the ears, and felt chiefly in the forehead and temples. The bowels are costive; and the patient is depressed, heavy and indisposed to exertion. *b.* In delicate or young persons, whose mental faculties have been prematurely exercised, or exerted to the neglect of the physical powers, the slightest excitement and the most trifling causes will produce headach, with coldness of the extremities, and great susceptibility of the nervous system, especially of females. The principal flux of the circulation takes place to the head, and the functions of other parts are performed imperfectly.—*c.* In persons of the middle age, or beyond it, and especially in those who have lived fully or intemperately, the headach is heavy, rending, or throbbing; often general, or referred chiefly to the occiput; attended with increased heat of the scalp, with distension of the veins about the temples, with fulness or redness of the eyes, and sometimes also of the whole countenance. The face is occasionally bloated, and its expression heavy; the pulse is full, strong, and oppressed, or slower than the usual standard; the bowels are torpid, the liver inactive, and the urine high-coloured or loaded. Sleep is heavy, but often disturbed. In some cases, however, with all, or nearly all, these symptoms, the patient is excited, or restless, is watchful, or sleeps but little, or is irritable, and the pulse is slightly accelerated; the excretions being scanty. In the first and second classes of persons, this form of headach not infrequently precedes inflammation of the brain and membranes, or effusion from the latter: in the third

class, it more frequently ushers in apoplexy or palsy.

17. iv. DYSPLEPTIC AND BILIOUS HEADACHS.—

A. This variety of headach is very nearly allied to the nervous and congestive, and it has been confounded with these in the description of it given by Dr. WARREN. From the circumstance of sickness or vomiting being a frequent symptom, the term *sick headach* has been commonly applied to it. But I am convinced that this symptom often depends upon the brain, and that many cases, which have been viewed as merely instances of sick headach, have actually been cases in which the affection of the brain had been attended both by sickness and by headach (§ 2. *et seq.*). This form of disorder frequently affects dyspeptic persons who have been longer than usual without food, or who have committed even slight errors of diet, and whose bowels are habitually sluggish. It may occur, as Dr. BURDER remarks, without any obvious susceptibility of the brain; or in persons who can bear close application to study without inconvenience as respects the head, and yet who are liable to headach after taking certain articles of food, or mingling them in too great variety.

18. Dyspeptic headach, particularly when attended by nausea or vomiting, is observed chiefly in persons subject to mental or cerebral excitement, and in whom the gastric disorder, as well as the pain of the head, are only effects of that excitement. In these, the stomach is either irritable, or weak, or even both, and unfit to perform its functions, as well as very liable to become further disordered by slight causes. Stomach headach generally affects the forehead on one temple, particularly the left; but it often extends over most of the head. When the left temple is chiefly affected, tenderness of the left eye is frequently also felt. The pain is dull, heavy, or oppressive, or acute, sharp, or darting. The mental faculties are somewhat weakened, and exertion of the mind is irksome. Tenderness of the scalp is seldom present, unless in a slight degree, or in connection with rheumatism. This variety of headach usually commences when the patient first wakes. It is then oppressive, heavy, or diffused. Nausea often supervenes, and sometimes vomiting. When the pain is slight, it generally subsides after breakfast; but if retching occurs, it continues longer, or until offending matters are thrown off, and then becomes more limited or concentrated. The remains of an undigested meal, or merely an insipid fluid, mixed with frothy mucus, is at first ejected. But if the vomiting continue, bile is frequently discharged. In some instances, an acid or acrid fluid, or greenish bile, is vomited, when pain and all the symptoms disappear. If the attack be not arrested by suitable means, or by the spontaneous vomiting, the pain often increases as the day advances, until stimulating food or beverages taken into the stomach, or sleep, allays it; but it may return the following day. Dyspeptic headach, however, may take place much more slightly and transiently; or it may assume a more chronic or continued form. It may follow a principal meal, and cease in two or three hours; or it may not occur until several hours after a meal. The pulse is languid or feeble, seldom accelerated. The tongue is white, loaded, particularly towards the root;

and its edges are slightly red, and often indented by the teeth. The bowels are usually costive. Vision is frequently indistinct; and coldness or slight numbness of the fingers is sometimes complained of.

19. *b.* It has been supposed by Dr. WARREN and Dr. PARIS, that, when the headach does not occur until several hours after a meal, and particularly when uneasiness or a sense of distension is felt in the situation of the duodenum, it depends upon irritation of this viscus. The circumstance of an emetic often failing to afford relief in such cases, or to evacuate any thing material from the stomach, whilst a dose of rhubarb and magnesia, or of any other purgative, generally removes both the headach and the uneasiness in the course of the duodenum, has been considered as proof of the dependence of the affection of the head upon disorder of this bowel. Without questioning the existence of functional disorder of the duodenum in these cases, the origin of the headach in that disorder does not necessarily follow. Both affections, most probably, depend upon the same pathological states; and it is, moreover, extremely likely that the derangement of the duodenum extends more or less to both the stomach and liver. The symptoms which the writers just referred to consider characteristic of headach proceeding from disorder of the upper portion of the intestines, — particularly chilliness of the body, coldness and dampness of the hands and feet; severe pain of the head, with a sense of coldness and tightness of the scalp; slight giddiness, with weight, distension, and stiffness of the eyeballs, and the appearance of brilliant ocular spectra; and sometimes tingling and numbness of the fingers and hands, — arise as much from disorder of the stomach or liver, or both, as from derangement of the duodenum and upper parts of the intestines. More dependence may, perhaps, be placed upon flatulency and the sensation of dryness and inactivity of the bowels noticed by Dr. PARIS, and upon the presence of nausea without vomiting; but it is most probable that the altered sensibility referred to the head, equally with the symptoms just mentioned, depends primarily upon the state of organic nervous influence.

20. *B.* Biliary derangement is generally connected with more or less disorder of the stomach and bowels: the affection of the one may have extended to the other; or all may have been simultaneously disturbed by causes affecting the nervous or the vascular systems. In either case, the disturbance is not infrequently also extended to the head, and partly manifested by pain in this situation, particularly in the forehead, eyebrows, and orbits. — *a.* The headach may proceed from an interrupted discharge of bile into the duodenum, and a consequent accumulation of it in the gall-bladder or hepatic ducts; the morbid impression thereby made upon the organic nervous system affecting the head, and often, also, other remote parts. When the headach arises from this state of disorder, vascular action is generally weak, languid, or depressed, the tongue loaded or white, the skin harsh or unhealthy in its hue, and the functions of digestion and fæcation impaired. In these cases, flatulency, coldness of the extremities, and a sense of smarting in the eyes and eyelids, or pain in the eyeballs, are often, also, complained of.

21. *b.* In some instances, headach proceeds from an exuberant secretion of bile, or from the irruption of morbid bile into the duodenum; but, in most of these, there are increased vascular action and heat of skin, with nausea and bilious vomitings. The face is flushed, the eyes suffused, and the pain is throbbing or rending. The evacuation of bile often gives relief; but the retchings sometimes keep up the secretion, or promote the discharge of it; and the digestive mucous surface, and the nerves supplying it, being thereby irritated, vascular action becomes excited, and the sensibility even of remote parts more or less altered: pains of the head, loins, and limbs are thus induced.

22. *C.* The *Causes* of dyspeptic and bilious headach have a very intimate relation to the predisposition or susceptibility of the nervous systems and digestive organs to excitation or irritation. — *a.* Such susceptibility very often exists in a high degree in persons of sedentary and studious habits. Intense application of the mind, the anxieties of parents, the eager pursuit of business or of gain, the speculations of merchants, the gambling transactions of the stock markets and of club-rooms, &c., keep the mind in an almost constant state of excitement, determine an augmented flow of blood to the brain, and thereby increase the irritability of the stomach, and predispose both organs to be disordered by the slighter causes to which the latter is so much exposed. As vital power becomes weakened, the susceptibility of the cerebro-spinal nervous system is increased, and the sensibility of it more readily disturbed. The digestive and assimilative functions are also weakened, and more prone to disorder, which not infrequently affects the brain, especially when its circulation has been excited, or kept in an almost constant state of erethism, by the circumstances just adverted to. Dyspeptic headach is most common in the young or middle aged. The bilious variety is most prevalent during summer and autumn.

23. *b.* The *exciting causes* are — errors in diet, especially too great a variety or quantity of food; indigestible, acrid, cloying, rich, or heavy articles; too long fasting; the excessive use of diluents or of stimulating or intoxicating beverages, particularly of spirituous liquors; costiveness or constipation, and the irritation of morbid secretions and fæcal matters retained in the bowels. In young persons, especially, headach and increased determination of blood to the head are frequent consequences of costiveness, of collections of sordes or of fæcal matters in the digestive canal, and of intestinal worms.

24. *V.* HEADACH FROM ORGANIC CHANGES. — In the early stages, this form of headach can hardly be distinguished from the other varieties; indeed, organic change not infrequently originates in some one of the pathological states of which headach is an occasional attendant. But, whilst in all these varieties the pain is only sometimes present, or is, at least, entirely absent for considerable periods, that produced by organic lesion is nearly constant or continued, or merely remits, without altogether disappearing. The alterations which are attended by headach are numerous; indeed, all those enumerated in the articles BRAIN (§ 3—133.), and CRANIUM, may give rise to it; but the most common are tumours of various kinds, hydatids,

exostosis from the inner surface of the cranium, ossific formations, softening of the substance of the brain, suppuration, adhesions of the membranes; tubercular, cancerous, fungous, and malignant productions, &c. Besides these, aneurismal or ossified arteries, varicose or inflamed veins, obstructions in the sinuses and veins; concretions, albuminous exudations, or purulent matters in these vessels (LIEUTAUD, BORSIERI); enlargement of the pineal or pituitary glands, serous effusion, &c., have been observed.

25. The pain caused by any of these lesions is generally fixed, often referred to the same spot, continued, and deep seated. It is independent of the other causes of headach, although aggravated by them, by mental application, by stooping, and by stimulants. Dr. BURDER justly remarks, that cheerful conversation, that would chase away, or at least suspend, the feeling of ordinary headach, often becomes insupportable in this variety. When the disease is farther advanced, even a slight motion of the head, or rotating it, often gives rise to extreme suffering, and sometimes to vomiting. The affection of the stomach dependent upon the cephalic lesion frequently occurs without any obvious cause, or independently of apparent disorder of the stomach itself, or of any error in diet; and the pain of the head remains when the sickness ceases. Although the pain is generally constant, yet remissions are sometimes felt, or even short intermissions, especially early in the disease. This is even the case when the lesion is malignant or carcinomatous, or consists of fungous tumours; and the pain is usually then lancinating, stounding, or darting, and referred to a particular spot. In the advanced stage of organic headach, spasmodic contractions of the limbs, vertigo, convulsions, paralysis, or idiotism, frequently supervene. When the lesion is of a malignant or contaminating nature, the surface generally assumes a pale straw-coloured hue, or is obviously cachectic. Neuralgic pains in the face, or in more remote parts, darting pains in the limbs, are also occasionally present in this variety. (See arts. BRAIN—*Softening of*, &c., and PALSY.)

26. vi. HEADACH FROM DISEASE OF THE PERIOSTEUM AND CRANIAL BONES.—This variety is not often met with. Cases of it have been recorded by Mr. CRAMPTON, Sir E. HOME, Dr. ABERCROMBIE, and others; but the best description of it is given by Dr. BURDER.—*a.* Affection of the *periosteum* is usually caused by exposure to cold, to currents of air, to humidity, and vicissitudes of temperature and weather. The pain is tensive, remitting, and increased by pressure, and by the action of the temporal or occipito-frontalis muscles. There are sometimes fever and excited action of the vessels of the head, with increase of the heat of the scalp. A constrictive pain is caused or aggravated by going into a cold room, or by removing the usual covering from the head. Dr. BURDER observes, that this variety of headach occurs only in those who have suffered from continued cerebral excitement; and that it is commonly dependent upon a highly susceptible, or preternaturally vascular, condition of the brain or its membranes, such as is often induced by long-continued study, by mental irritation, or by gastric or hepatic disorder, connected with de-

bility or exhaustion. If a person, whose nervous or vital powers are thus impaired, and whose brain and membranes are rendered susceptible and vascular, is exposed to the exciting causes just mentioned, periosteal cephalalgia of great severity or obstinacy is often produced; the external affection, with the consequent irritation and want of sleep, aggravating the morbid condition of the brain and membranes. The cases which I have seen have been chiefly in persons of the scrofulous diathesis.

27. Cases of fixed pain of the head, and tenderness of a portion of the scalp, with thickening or swelling of the integuments, have been observed by the writers just mentioned, and by Mr. PEARSON and Sir C. B. BRODIE. I have seen instances of this affection originate in *otitis*: one of these was in a medical friend, who consulted also Dr. J. JOHNSON and Sir C. B. BRODIE. The external disorder followed the use of the cold douche or shower bath, recommended for the removal of increased vascular action and heat of the scalp indicative of cerebral excitement.—Division of the pericranium in these cases has generally shown thickening of the periosteum; and even disease of the bone in a few instances.

28. When headach is owing to a diseased state of the bones (see art. CRANIUM), there are constant pain and tenderness of a particular spot. Some of these cases originate in syphilitic or mercurial cachexia. Others proceed from inflammation of the ear, and are connected with chronic discharges from this organ, or consist of caries of a portion of the petrous bone, or of the mastoid process. In the cases of this kind which I have seen, there was partial paralysis of the face, with excessive swelling around the ear, especially below it, and extending even to the eye. I attended one of these cases with Mr. BARNWELL; and another was seen by Sir C. BELL and myself, and is noticed in his work on the nervous system. Similar instances are recorded also by J. FRANK and others.

29. vii. RHEUMATIC AND ARTHRITIC HEADACH.—*A. Rheumatic Headach* is usually caused by exposure to cold, or to cold and humidity, or to currents of air; by uncovering the head when perspiring; by sleeping on a damp pillow; by the passage of air through a carriage window; by sudden vicissitudes of temperature or of weather, especially by easterly or northerly winds. But a *predisposition* arising out of the rheumatic diathesis, or of disorder of the digestive organs—particularly torpor of the liver, accumulations of bile in the bile passages, and collections of sordes in the intestinal canal—is often necessary to the production of this affection of the head.

30. Rheumatic headach is often preceded by a sense of coldness over the head and face, especially on one side. It is seated chiefly in the aponeurosis of the occipito-frontalis and temporal muscles; but it is not always confined to this structure, it being sometimes associated with increased vascular determination to the membranes of the brain. The pain is severe, heavy, distracting, or aching, and in its uncomplicated state is attended by a sense of coldness, by great tenderness of the scalp, by rheumatic pains extending down the neck, or in one side of the neck, or in one shoulder, or in the face; sometimes by copious perspirations; and more rarely by rheu-

matic inflammation of one or both eyes. It is generally aggravated in the evening, and alleviated in the morning, and by warmth. There is no increase of the temperature of the scalp, or augmented action of the arteries of the head, unless the affection be complicated with excited vascular action in the internal membranes. If it be thus complicated, these symptoms are also present; and, as Dr. ELLIOTSON justly observes, there are likewise giddiness, drowsiness, and internal throbbings. This associated disorder is seldom ameliorated by warmth; and the face is often flushed, the eyes injected, and the vessels loaded.

31. *B. Arthritic Headach* is met with in persons who are subject to the irregular forms of gout; and, in those who have an hereditary or an acquired predisposition to this malady, it may be the first manifestation of the gouty affection. Of this I have seen more than one instance, both in males, and in females about the change of life. It is not an unusual form of misplaced or of retrocedent gout, in persons who have had the disease in its more regular forms, but who neglect the air, exercise, and regimen necessary to the development of a regular paroxysm; and it is often a dangerous affection. The pain is severe, and attended by a sense of fulness and of heat or burning in the head; by remarkable tenderness, and by increased heat of the scalp; by giddiness, dimness of sight, and fear of approaching insensibility, especially upon stooping; by sounds in the ears, great acuteness of hearing, and intolerance of noises; by flushes of heat in the face; by irritability of temper and restlessness; and by confusion of thought and loss of memory. There are also flatulence and disordered digestion; costiveness; a morbid state of the stools, and of the biliary secretion; and scanty high-coloured urine, which deposits a copious reddish sediment. The tongue is generally loaded, and its papillae excited; and the pulse is either natural, as to frequency, and full, or accelerated and hard, or oppressed. If this affection is not removed, it may pass into effusion, with comatose or apoplectic symptoms. (See GOUT—*Irregular Forms of*, § 16.)

32. viii. INTERMITTENT HEADACH — *Cephalalgia Periodica*, Auctorum — *Febris Intermittens cephalica larvata*, J. FRANK — usually presents the same characters as the functional varieties already described, especially the nervous and dyspeptic, and differs from them only in respect of periodicity. But it may be not merely functional; for the pain caused by chronic inflammation of the membranes, or even by organic lesion within the cranium, may assume, at their early stages, an intermittent type. A strict investigation of the causes, and of the states of the various functions, is therefore requisite to a knowledge of the nature of the affection. When the headach proceeds from terrestrial exhalations, or from cold, raw, easterly or northerly winds, and attacks persons who have been affected with agues or remittent fevers, it generally returns daily, either in the morning or about noon; but it may observe a tertian or quartan form. It is often limited to a particular part of the head, — frequently to the forehead, or to one brow, or to the brow and orbit — brow-ague. It is sometimes seated in one half of the head. The pain is occasionally so severe and so limited in extent, as closely to re-

semble neuralgia. Indeed, intermittent headach and neuralgic affections almost insensibly pass into each other; the paroxysms of the latter being, however, much more intense and of shorter duration than those of the latter; and they both frequently proceed from the same predisposing and exciting causes, namely, disorder of the stomach, bowels, and biliary organs, and exposure to malaria, or to cold damp winds, &c.

33. ix. HYSTERICAL AND SYMPATHETIC HEADACH. — The pain in the head is one of the numerous forms in which hysteria manifests itself. It is generally limited to a small space, or to a single spot; and is often described as resembling a wedge or nail driven into the cranium or pressing upon the brain — *Clavus*, &c. It is commonly sympathetic of irritation of the uterine organs, and associated with irregularity of the uterine discharge — with painful, scanty, or excessive menstruation, or with leucorrhœa; and with flatulent borborygmi, or with the globus hystericus. I have seen it also connected with worms in the intestines, with the irritation of calculi in the kidneys, and with tenderness, and other indications of inflammatory irritation, of parts of the spinal chord and membranes. — Indeed, affections of the spine seldom exist without pain in the head, in some one of its forms, being occasionally felt.

34. x. HYPOCHONDRIACAL HEADACH. — Pain of the head is often one of the most distressing symptoms of which hypochondriacal and melancholic persons complain, and is exaggerated by them into the most intense suffering that can be imagined; and yet, when their attention is directed to other objects of interest, or when they are otherwise excited, this part of their miseries seems altogether forgotten, or for the time removed. Their minds brood upon the cause and consequences of the pains referred to this situation, until they firmly believe the very worst results. A patient, some time since, called upon me to know whether or not I considered the pain to depend upon organic change; and, although my opinion was that this was not the source of the affection, yet several visits were afterwards made to me with the same object. Another more recently came under my care, with the firm belief that the headach would terminate in insanity or idiotism. Such cases are, however, not rare; and although the fears, which subsequently become the firm convictions, of the patient, are fulfilled in some instances, or even impel them to suicide in others, yet recovery is not infrequently effected by judicious treatment and management. The source and character of the pain in such cases are ascertained with difficulty, as the patients' accounts are often exaggerated; but are most frequently dependant, as far as I have observed, upon the state of the nervous system, in connection with chronic disorder of the digestive canal and biliary organs. The organic nervous energy is manifestly impaired, and all the functions which chiefly depend upon it. But I have seen cases furnishing evidence of congestion, or of chronic inflammatory action, of the brain or of its membranes, and have found a treatment based on this view more or less beneficial.

35. xi. OF HEMICRANIA, AND PARTIAL AND NEURALGIC HEADACHS. — These can scarcely be considered as distinct varieties of headach, inasmuch as the pains proceeding from the patholo-

gical states which have been passed in review are very frequently limited in extent, or confined to one side of the head, or affect it chiefly. This is especially the case with the dyspeptic, the bilious, the organic, the nervous, the rheumatic, the intermittent, and the hysterical varieties; and it is still more so in respect of that, upon which a few observations remain to be made — the *neuralgic*. — *A*. This variety is characterised principally by the intensity of the pain, which is confined to a single spot, or extends in the course of a single nerve. The pain comes on in violent paroxysms, is of short duration, and is followed by distinct, and often by considerable, intermissions. There is generally increased sensibility or tenderness of the scalp around the seat of suffering; and the digestive organs often betray disorder. The nervous system is susceptible and weakened. The pulse is seldom materially disturbed. This is only one of the numerous situations in which NEURALGIC AFFECTIONS (see the article) manifest themselves.

36. *B*. *Partial or limited Headach* is often excited by local causes of irritation. — Very severe pain in the situation of the frontal sinuses has been experienced, owing to the ova of insects having passed by the nostrils to this part. PLOUQUET gives numerous references to cases where the larvæ of insects had occasioned intense pains. A servant in my own family suffered from this cause, the larva being discharged upon a violent fit of sneezing. Caries or disease of the fangs of the teeth is often the cause of partial headach, the pain being sometimes confined to a single spot on the same side of the head as that in which the cause of irritation is seated.

37. *xii*. *DIAGNOSIS*. — There is no class of affections which requires greater discrimination than this; and there is, perhaps, none which is esteemed more lightly by practitioners, or more empirically treated; the digestive organs being considered much too generally as the source of disorder. I believe that a careful investigation of the cases, and close observation of the juvenia and lædientia, will show that a greater number of them depend upon chronic inflammation of the brain, or of its membranes, than is commonly supposed. The diagnostic symptoms of each variety have been enumerated in the description of it; but the following summary may be given at this place: — (*a*) *Nervous headach* is distinguished by absence of constitutional disorder, by susceptibility of the nervous system, by the feeling of constriction, and the limited extent of the pain, by the natural temperature of the head, &c. (§ 11.). — (*b*) The *congestive* is characterised by the numb, dull or heavy, oppressive, and deep-seated pain; by languor of the circulation; by pallor or heaviness of the countenance; by dizziness, drowsiness, and want of animation; by the coolness of the scalp, and sometimes by fulness of the eyes and a bloated state of the face (§ 14.). — (*c*) *Plethoric and inflammatory headach* is manifested by the general, severe, rending and throbbing pain; by nausea or vomiting; by fulness of the vessels, or flushing of the face and eyes; by the full, hard, or oppressed pulse; and by the increased temperature of the head (§ 16.). — (*d*) The *dyspeptic* and *bilious* is evinced by dull, aching, or racking, or shooting pains, which move from one part to another, and

are often attended by soreness of the scalp, by disorder of the digestive organs, and flatulence; by a loaded tongue, foul breath, and a morbid state of the secretions, especially the biliary (§ 18–21.). — (*e*) The *organic* is distinguished by internal acute pain, which becomes more and more constant or prolonged; by sudden retchings; by a quick, irritable, or irregular pulse; by the pain darting or shooting from one situation; by tenderness or soreness on pressure being felt, particularly when the bones are affected; by alterations in the sensibility and motions of a limb or limbs; and by symptomatic pains, spasmodic contractions, &c. (§ 25.). — (*f*) *Rheumatic* and *arthritic headachs* are readily recognised from the diathesis of the patient, and from the causes and characters of these affections. The rheumatic is generally connected with rheumatism of an adjoining part (§ 30.). The arthritic presents symptoms that cannot be mistaken, especially when viewed in connection with the history of the case (§ 31.). The description of these, and of the other forms of headach, has been so fully given, that nothing further respecting their diagnosis is requisite.

38. *xiii*. *PROGNOSIS*. — A favourable result may be anticipated of cases of the nervous, the dyspeptic, the bilious, the rheumatic, the aguish, and the hysterical headach. A guarded opinion should be given respecting the inflammatory, the arthritic, and the rheumatic when associated with increased vascular action in the internal membranes (§ 30.). When headach is accompanied with vomiting, without obvious disorder of the stomach having preceded the attack, an inflammatory affection of the brain should be suspected; and a prognosis, conformable with this view, ought to be given. A still more unfavourable opinion should be entertained if the locomotive powers, if the memory, if the senses, or if utterance or articulation become impaired. If there be sufficient evidence of disease of the brain, or of its membranes, great danger exists, although a fatal termination may be long delayed, or even deferred for some years, as in cases of palsy. If the pericranium be affected, and especially if the bones of the cranium be diseased, a very guarded, if not a very unfavourable, prognosis is necessary.

39. *xiv*. *TREATMENT*. — It is evident that the indications for the cure of headachs should be inferred from the nature of each; that remedies ought to be directed to their pathological conditions and relations, ascertained by a close examination of the states of the organic and locomotive functions, of the senses, and of the mental manifestations. And, although what has been advanced above may aid the inexperienced, or furnish useful suggestions to many, yet the successful administration of remedies in these affections will entirely depend upon accuracy of observation, and upon pathological and therapeutical knowledge previously acquired. — *A*. *Nervous Headach*, proceeding from depression or exhaustion, obviously requires the nervous energies to be restored by tonics and stimulants. These medicines, however, should be administered with due caution at first; as the more active of them, or too large doses, may excite fever, or even occasion vascular determination to the head. They ought not to be given, or continued long, until fecal accumulations have been re-

moved by mild or stomachic purgatives, which should afterwards be prescribed occasionally, in conjunction with deobstruents, in order to preserve the excreting functions in a state of healthy activity. Whilst the head ought not to be kept too warm, the impression of cold must be prevented, at least until the organic functions have acquired their usual tone. In most instances, the milder tonics may be given, with the alkaline subcarbonates, or the aromatic spirit of ammonia, and with carminatives. The diet should be light and nourishing, the occasional causes avoided, and gentle exercise in the open air daily taken. In slight cases, these means, and a due regulation of the digestive functions, will remove the disorder; but, if they fail, those about to be noticed should be resorted to.

40. Nervous headach may prove obstinate, or it may be unusually violent from the commencement, or gradually become so. If, in these cases, the symptoms, especially those connected with the organic functions, the senses and cerebral manifestations, evince neither vascular action nor organic lesion within the cranium, tonics conjoined with anodynes, antispasmodics, or carminatives, according to the peculiarities of the case, should be resorted to. The preparations of cinchona, of valerian, of arnica, of assafoetida, and of ammonia; camphor in full doses; the æthers; the carbonate of iron, the nitrate of silver, &c., are then severally indicated, and may be given with opium, or with the acetate or muriate of morphia, or with hyoscyamus, or with belladonna, according to circumstances. If there be prolonged watchfulness, a suitable narcotic should be exhibited at, or shortly before, bedtime. I have found the following medicines of great benefit in some very severe cases of this kind, the pills (No. 245.) having been taken, in addition to the mixture (No. 246.), during the violence of the attack. An increased dose of the pills, or the anodyne draught, may also be given at night. *Formulæ* 24, 25. 36. 269. 367. 423. 539. 555. prescribed in the *Appendix*, also, may prove useful in this variety of headach.

No. 245. R. Camphoræ rasæ gr. xij.—xviii.; Extracti Hyoscyami 3 ss.; Conserv. Rosarum q. s. ut fiant Pilulæ xij., quarum capiat duas, quartâ vel quintâ quâque horâ.

No. 246. R. Infusi Valerianæ 3 x.; Sodæ Sub-carbonatis gr. xij.; Spiritus Ammoniaë foetid. 3 j.; Spiritus Lavand. Comp. M xx.; Tinct. Aurantii Co. 3 j. M. Fiat Haustus, quartis, quintis, vel sextis horis sumendus.

No. 247. R. Quininæ Sulphatis, Camphoræ rasæ, aa gr. x.; Extr. Aloës purif. gr. xij.; Extr. Hyoscyami 3 ss.; Mucilag. Acaciæ q. s. M. Fiant Pilulæ xxiv., quarum capiat unam, vel duas, vel tres, bis terve in die.

41. *B. Congestive Headach* should be treated according to the age, habit of body, and constitutional power of the patient; and to the local as well as general state of the circulation. It should not be overlooked, that vascular action in the brain, owing either to impaired vital power of the capillaries, and of the organ generally, or to impeded return of blood by the veins and sinuses, is insufficient for the due performance of the several functions of this part of the frame. — *a.* In delicate or irritable persons, stomachic or mild purgatives, tepid or cold sponging the head with fluids containing aromatic and fragrant substances, as lavender or Cologne water; derivatives, especially warm or stimulating pediluvia; the internal exhibition of camphor, ammonia, valerian, gentle tonics, &c.; light diet, and moderate

exercise in the open air; will prove most serviceable. Local bloodletting will seldom be required, even in small quantity; blisters behind the ears will be productive of benefit, in some cases; and the effusion of tepid water on the head, in others. As the patient's strength improves, cold sponging the head or the shower bath, and friction of the scalp, will be useful in preventing a return of the affection. Where there is much irritability, the combination of hyoscyamus, or of small doses of the powder or extract of belladonna, with the medicines just named, and strict attention to diet, air, and exercise, will generally be found of advantage.

42. *b.* When this form of headach affects persons whose vital powers have been exhausted by dissipation and unrestrained indulgences, or those of a leucophlegmatic habit of body, the treatment should be still more restorative, tonic, or stimulant than the foregoing (§ 41.). Even local depletions will be injurious, and the cold affusion on the head will be of little service, unless the affection has followed the use of narcotics, or when the head is hot. Cordial stomachic aperients, warm spiced wine, or coffee; the preparations of ammonia, or of camphor, or of valerian, or of arnica, &c.; stimulating pediluvia; and blisters behind the ears, or on the temples, or even on the head, in extreme cases; are amongst the most appropriate remedies in cases of this kind. After these have relieved the more distressing symptoms, the complete removal of the disorder, and the prevention of a return of it, may be attempted, by promoting the digestive, the assimilating, and the excreting functions; by the use of tonics — of the preparations of bark or of iron; and by mild chalybeate and aerated mineral waters. But, before these are prescribed, the secretions and excretions should be freely evacuated, and their morbid states corrected, by alteratives and mild purgatives (F. 205. 266. 430.). And, during the course of restorative medicines, these should be frequently resorted to. The facitious mineral waters of Carlsbad, Marienbad, or of Pyrmont or Spa, subsequently may be cautiously tried; but those of Seidschutz or Pullna should, in many cases, precede the use of these.

43. *c.* When congestive headach occurs in the plethoric, the indolent, and well-fed; in persons about or past middle age, or who have experienced obstructions of the liver, or of any accustomed evacuation; the treatment should be very different from the above. General or local bloodletting, the affusion of cold water on the head, brisk cathartics, and derivation to the extremities by warm and stimulating pediluvia or manuluvia, are chiefly to be depended upon. But these will fail of being permanently useful, unless the diet of the patient be restricted, and regular exercise be taken in the open air. The secretions and excretions ought, also, to be freely and regularly promoted. A daily recourse to the shower bath will prove of great service.

44. *d.* When this form of headach proceeds from prolonged or intense mental application or exertion, not only should the above means be adopted, according to the age, strength, habit of body, and modes of living of the patient; but entire relaxation of the mind, change of air, travelling, the amusements of watering places, sea-voyaging, early hours, light reading, and

horse exercise, should be enjoyed, as circumstances may permit. At the same time, the mineral waters most suited to the peculiarities of the case may be taken, especially those that are deobstruent, aperient, and gently tonic; and, whilst the functions of digestion and assimilation are promoted by restoratives, and by breathing an open dry air, the secreting and excreting actions of the abdominal viscera should receive strict attention.

45. *C. Plethoric and Inflammatory Headach* requires the adoption of the means just enumerated (§ 43.), but in a much more active manner. The regimen ought to be strictly antiphlogistic; and permanent derivation, or counter-irritation, established by means of issues or setons in the nape of the neck, or of the tartar emetic ointment, or of croton oil, applied in this situation and in its vicinity. The bowels ought, also, to be copiously and frequently acted upon. When this form of headach follows the disappearance of accustomed discharges or eruptions, or of hæmorrhages, this treatment should be most strictly enforced, and the use of external as well as internal derivatives strenuously persisted in. (See BRAIN—Congestion of, § 139., and Inflammation of, § 191.)

46. *D. Dyspeptic and Bilious Headachs.*—*a.* The former will be remedied by the means advised in the article on INDIGESTION. I may, however, state in this place, that, when this headach is attended by nausea, and when it is clearly ascertained that the sickness does not proceed from inflammatory action within the cranium, an ipecacuanha emetic, vomiting being promoted by drinking chamomile tea or warm water, will generally give relief. After the stomach is evacuated, and the nausea is gone, a mild purgative, as the compound rhubarb pill; or the sulphate of magnesia, with carbonate of magnesia and a carminative spirit or tincture in an aromatic water; or rhubarb with magnesia or an alkaline subcarbonate, and any aromatic or carminative medicine, will give further relief, by changing the state of the secretions in the stomach and upper part of the intestines, and by promoting the excreting functions of the latter, and of the large bowels. If nausea be not present, these purgatives should be given forthwith, and repeated until the bowels are freely evacuated. Suitable light diet, exercise in the open air, and an occasional recourse to these or similar aperients, will prevent a return of the affection. I have found the following most serviceable, when given with this intention, in moderate doses. In larger doses, they will also remove the complaint.

No. 248. R. Pulveris Rhei ʒss.; Extr. Fellis Bovini, Extr. Aloës purificati, āā ʒj.; Saponis Duri gr. xv.; Pulv. Ipecacuanhæ, Pulveris Capsici, āā gr. xij.; Balsami Peruviani, Olei Carui, āā gutt. viij. Contunde benè simul, et massam divide in Pilulas xxxvj., quarum capiat unam vel duas, cum prandio, vel horâ somni.

No. 249. R. Infusi Gentianæ Comp., Infusi Sennæ Comp., āā ʒiij.; Sodæ Sub-carbon. ʒij. (vel Magnesie Sulphatis ʒvj.); Tinct. Jalap. ʒjss.; Tinct. Sennæ, et Tinct. Cardamom. Comp., āā ʒiijss. M. Fiat Mist., cujus capiat Coch. iij. ampla horâ somni, vel Coch. iv. primo mane.

47. *b.* When *bilious headach* seems to depend upon the congestion or accumulation of bile in the biliary passages, then chologogues, particularly calomel or blue pill, should be given, and followed, after a few hours, by a stomachic purgative, which should be repeated until a full effect is produced. In these cases, it will often

be necessary to repeat the mercurial, as well as the purgative, oftener than once; the infusion of senna, or equal parts of it and of a tonic infusion, being given with an alkaline subcarbonate, or with a neutral salt and the extract of taraxacum, or the supertartrate of potash in large doses, with the confection of senna, and this extract. When the headach seems to proceed from an exuberance of acrid bile, then demulcents with cooling aperients, or with alkaline carbonates, saline medicines in a state of effervescence, and warm mucilaginous diluents, are generally useful. In cases of this kind, it is necessary to dilute the acrid secretions, to evacuate them from the bowels, and to protect the digestive mucous surface from their irritating operation. When the acridity of the bile is the consequence merely of its retention and accumulation in the biliary apparatus, then these means will be sufficient to remove disorder; but when it depends upon the exuberance in the blood of the elements whence bile is formed, or upon a morbid action in the liver, a vegetable or farinaceous diet, bland fluids, the alkaline carbonates and refrigerants in camphor mixture, regular exercise, especially of the muscles of the upper extremities and of the trunk, are then required. If the action of the liver is not improved by these means, recourse should be had to mercurial alteratives or aperients; and, if it be connected with vascular excitement of, or determination to, the organ, local depletions, antimonial preparations, diaphoretics and diuretics, external derivatives, and the antiphlogistic regimen, should be prescribed. In every case, fæcal accumulations and morbid secretions should be regularly evacuated by the means already advised.

48. *D. Organic or Cerebral Headach.*—When the patient complains of increased pain in the head on moving it, of spasms or pains in the limbs, or of impaired sensibility or motion of them, of sickness, and of any of the characteristic symptoms of this variety (§ 25.), depletions, general or local, according to the peculiarities of the case; deobstruent purgatives; internal and external derivatives, blisters applied on the nape or behind the ears and kept long discharging, setons or issues, low diet, mental and bodily repose, and local or general refrigerants, or diaphoretics, as circumstances indicate, then constitute the principal means of affording relief. After these have removed vascular excitement, small doses of the bichloride of mercury, or of the iodide of mercury, or of the hydriodate of potash, or of the ioduretted hydriodate of potash, or of the arsenical solution, may be prescribed, and continued until the effects are ascertained. But external derivation should be also persisted in. (See also arts. BRAIN, § 211. 222., and PALSY.)

49. *E. Pericranial Headach.*—When the affection proceeds from disease of the pericranium or of the cranial bones (§ 26.), the treatment is essentially the same as that just advised (§ 48.); but it may be modified to meet various peculiarities and changes. If the affection is syphilitic, the bichloride of mercury, or the iodide of mercury, or the other preparations of iodine above mentioned, may be employed. If the periosteum, or the bone, be diseased, an incision should be made down to the affected part, and a free discharge afterwards maintained, as successfully

practised by Mr. PEARSON and Sir B. C. BRODIE. If this affection have proceeded from inflammation of the ear, the discharge from the external meatus of the organ should be allowed a free egress. (See EAR—*Inflammation of*, § 26—29.)

50. *F. Rheumatic and Arthritic Headachs* should be treated with strict reference to the diathesis or constitutional disorder.—*a.* If *rheumatic headach* is not associated with inflammatory action of the membranes, the head should be kept warm, and the secretions and excretions freely promoted and evacuated. After biliary and fecal accumulations have been carried off, camphor, ammoniac, and colchicum, may be given in conjunction; or one or more of these may be taken with bark or any other tonic; or with magnesia, or with the subcarbonate of soda or potash, especially when the urine deposits a copious sediment, or is acid. If severe symptomatic fever, or signs of inflammatory action in the cerebral membranes, accompany the rheumatic affection of the head, local depletions, antimonials, active cathartics, and derivatives, should be prescribed, and colchicum freely exhibited. But, when these symptoms are absent, either of the following medicines will generally give relief; a full dose of calomel, or of blue pill with James's powder, or some antimonial, having been taken at bed-time, and a stomachic purgative the following morning, and repeated according to circumstances:—

No. 250. R Camphoræ rasæ, Quininæ Sulphatis, Pulveris Radicis Colchici, aa gr. xvij.; Extracti Hyoscyami 3 ss.; Conserv. Rosar. q. s. M. Fiant Filulæ xxiv., quarum capiat duas, bis terve in die.—vel

No. 251. R Sodæ Sub-carbon. ʒj.; Tinct. Colchici Comp. 3 ss.; Tinct. Cardamom. Co. 3j.; Decocti Cinchonæ (vel Infusi Cascariillæ) 3 x.; Spiritus Lavandul. Comp. ℥xij. M. Fiat Haustus, ter in die sumendus.

51. *b. Arthritic headach* sometimes requires local depletions, from the nape of the neck and from behind the ears, especially in plethoric or robust persons; but a too great quantity of blood should not be taken away. The lower extremities ought to be put in warm water, containing flour of mustard and salt; and if the headach is not very much relieved by these means, mustard poultices may be applied to the feet. *Colchicum* should also be prescribed, with aperient or purgative medicines, and with magnesia, or the alkaline carbonates, as recommended in the article GOUT (§ 55. 82. *et seq.*). In these cases, the colchicum, when given in small or suitable doses, and continued for some time, in order to insure its action on the liver and on the kidneys, seems to favour the elimination of the superabundant urea from the blood; a great excess of this substance in the circulation being generally connected with the production of the gouty affection, in all its modes of manifestation. As urea is the sum or ultimate product of assimilation, or results from a combination of the effete elements of human organisation; and as it is liable to accumulate in the blood when the functions of excretion are impaired, owing to weakened organic nervous power (see art. GOUT, § 40—42.); so it is not improbable, that, when it is thus superabundant, it becomes an excitant not only of morbid or altered sensibility, but also of increased vascular action, and of local determination,—that, in short, it is the *materies morbi* of the ancients, and one of the forms which effete and excrementitious elements in the blood assume; and that it constitutes a part of the morbid

condition, of which I have shown gout to be the chief manifestation. This view is supported by the experiments of PROUT, CHELIUS, and others, showing the superabundance of urea, and its combinations in the urine, when the actions of the kidneys are freely exerted, towards the decline of the gouty attack.

52. *H.* It is unnecessary to enter into the treatment of the other *symptomatic varieties of headach*, inasmuch as the means of cure for them are essentially the same as are fully stated in the articles on those diseases, of which headach is a frequent symptom.—*a.* When the pain is *intermittent*, independent of organic lesion, and one of the forms which *masked ague* assumes, then a full dose of calomel, with James's powder, or of any other mercurial alterative, at bed-time, a brisk cathartic draught early the following morning, and, after the operation of these, the sulphate of quinine with camphor, or the preparations of bark and serpentaria, will remove the affection.—*b.* If the headach be *hysterical*, the means already advised for *nervous headach* (§ 40.) will generally remedy it. If, however, the pain be symptomatic of disorder of the uterine, or of the urinary, functions, the means of cure must be directed to the restoration of these functions to the healthy state, as shown in the articles on MENSTRUATION, URINE, and UTERUS; and to the removal of vascular plethora, by evacuations and derivatives, especially when the affection depends upon this state of the circulation, or arises from suppressed or diminished secretion or excretion. (See *Treatment of Plethoric HEADACH*, § 45.)—*c.* The headach attending *hypochondriacal affections* is frequently relieved by the means advised for dyspeptic and bilious headachs (§ 46.); but the treatment may be conducted in all respects as directed in the article on HYPOCHONDRIASIS.—*d.* *Local or neuralgic headachs* (§ 35.) require the removal of the cause of irritation, when it can be accomplished, and generally the means already advised for the nervous and congestive varieties (§ 40—44.),—sometimes a constant and energetic action to be exerted upon the intestinal canal,—frequently the exhibition of tonics, stimulants, and narcotics, or anodynes,—occasionally external irritants, or vesicatories, as moxas, croton oil applied to the surface, the tartar emetic ointment, issues, blisters, &c.,—in some instances, the application of narcotics, as veratria, &c., to the part affected, or of the acetate of morphia to the skin denuded of its cuticle, and the other means mentioned in the article on NEURALGIC AFFECTIONS.

53. XV. BRIEF ACCOUNT OF REMEDIES RECOMMENDED BY AUTHORS.—*A. Evacuants.*—*a.* *Emetics* have been advised for headachs by CÆLIUS AURELIANUS, HORSTIUS, RULAND, RIEDLIN, and FRANK; and are often of great benefit when the pain proceeds from injurious ingesta, from the accumulation of bile in the biliary passages, or from impeded circulation in the vena porta.—*b.* *Purgatives* are not less useful; and have been very generally, but often empirically, prescribed for headachs. SELIG trusted chiefly to them for the removal of the intermittent form of the affection. Considerable judgment is, however, requisite in the selection of medicines of this class, and in the combination of them with other substances, so as to secure all

the advantages they are calculated to afford. *ARETÆUS*, and many others of the ancients, employed *hellebore*. When the pain arises from accumulations of bile, or from obstructions to the excretion of this fluid, then *calomel*, conjoined with some other purgative, and occasionally also with antimony, or with *ippecacuanha*, is most appropriate. In the nervous, the congestive, the dyspeptic, the periodic, and in the hypochondriacal forms of headach, the stomachic purgatives prescribed above (§ 46.), or the combination of a purgative with a tonic, carminative, or aromatic, &c. (F. 215. 266. 379.), will be found most serviceable.—*c. Vascular depletions* are requisite in plethoric and inflammatory headachs. *Bleeding* from the arm, sometimes from a vein in the foot, or *cupping* on the nape, are the most eligible modes. *ARETÆUS*, *CÆLIUS AURELIANUS*, and *VELSCHIUS*, preferred cupping on the head itself. I have repeatedly directed it to be performed on the occiput, behind the ears, or on the temples; and, when a small quantity of blood is to be taken away, these are often preferable situations. *Leeches* may be applied in circumstances similar to those requiring cupping. *Arteriotomy* has received the sanction of *ARETÆUS*, *SCHENCK*, *WEPFER*, *WILLIS*, *ZACUTUS LUSITANUS*, and of many recent writers; but I believe that it possesses no advantages above the other modes of vascular depletion, even in the most inflammatory form of the complaint.—*d. Sudorifics* are most beneficial in the febrile, inflammatory, rheumatic, and periodic states of the affection. In the last of these, they have been prescribed by *MORGAGNI*. The selection of sudorifics or diaphoretics should be guided by the state of the general circulation, and of vascular action in the head. When either the former or the latter is excited, *tartarised antimony*, in frequent doses, or *James's powder*, and the more refrigerant diaphoretics, are most appropriate; but when the head is cool, and the pain is connected with rheumatism, depression of vital power, and suppressed cutaneous function, the *warm*, or *vapour bath*, *camphor*, the *mistura guaiaci*, or weak infusions of *serpentaria*, or of *arnica*, or of *briony*, will be more beneficial than antimonials, unless these latter be conjoined with opiates and restoratives.

54. *B. Stimulants and Antispasmodics*.—These are serviceable chiefly in the nervous, the rheumatic, the hypochondriacal, and the neuralgic forms of headach, and sometimes in the intermittent, the congestive, the dyspeptic, and hysterical.—The medicines of this kind most commonly prescribed are, the preparations of *camphor* and *ammonia*, the *succinated* and *fætid spirits of ammonia*, the *æthers*, *castor*, *musk*, *serpentaria*, *spirits of lavender*, &c.—Besides these, preparations of *arnica* have been recommended by *SELIG*, *DUMANGIN*, and *J. FRANK*; *cajeput oil**, by *THUNBERG*; a strong infusion of *coffee*, by *BAGLIVI* and *PERCIVAL*; an infusion of *verbena*, *betonica officinalis*, and *semina coriandri*, by *J. FRANK*; and the *ledum palustre* by *LINNÆUS*. *Valerian* has been praised by *STRANDBERG* and *FORDYCE*. I have found the infusion, with the ammoniated tincture, of *valerian*, or the fætid spirit of am-

monia, of great benefit in the headachs just mentioned. *Black pepper* has been recommended by *LANGE* in the dyspeptic variety; and its active principle, *piperine*, has been employed in the intermittent form of the affection. *Guaiacum* has been prescribed by *J. FRANK* in rheumatic and arthritic headachs. It is of service in combination with *colchicum* and *magnesia*, or with an alkali. *Green tea* and *coffee* are very commonly resorted to in the above forms of headach, as domestic remedies.

55. *C. Tonics*.—*a.* The preparations of *bark* are generally beneficial in the periodic and non-inflammatory kinds of this complaint. The *sulphate of quinine* is now generally preferred; but, in many cases, the decoction of *cinchona*, with the compound tincture, and an alkaline subcarbonate, will be more efficacious.—*b. Absinthium* was most frequently employed by the older writers. *RIVERIUS* conjoined it, or other bitters, with purgatives; a practice deserving of more general adoption.—*c.* The *cascurilla bark* was used, for nervous and dyspeptic headachs, by *RIEDLIN*; and is excelled only by *cinchona*.—*d.* The *muriate of ammonia* is also of service in the nervous and intermittent varieties.—*e.* The *arsenical solution* was praised by *DARWIN*. I have prescribed it, and taken it myself, for headach, with marked benefit.—*f.* The *muriate of baryta* was recommended by *HUFELAND*, for the pains proceeding from, or connected with, scrofulous disease.—*g.* The preparations of *iodine* are, however, more deserving of adoption, when the complaint is thus associated, and when it depends upon organic lesion. They may be given with any of the narcotics about to be mentioned. I have lately proved their efficacy in the rheumatic variety of headach, arising from the gonorrhœal infection. The *hydriodate of potash* is preferable in this latter form; and, indeed, in several others.—*h.* The extract of *nux vomica* is mentioned by *HORN*, and may be given in small doses, as a tonic, in the nervous, the rheumatic, and the hypochondriacal varieties; but its effects must be carefully watched. It is preferable to the active principle, *strychnine*, which should be prescribed only in very minute doses.

56. *D. Narcotics and Anodynes* have been employed in several of the varieties of headach, both externally and internally.—*a. Opium*, in various forms, has been directed by *WHYTT*, *MUR-SINNA*, *J. FRANK*, *W. STOKES*, and many others; especially in the nervous, the rheumatic, and intermittent kinds of the complaint. The *acetate* and *muriate of morphia* are now generally used; but they, as well as other preparations of opium, should be conjoined with *camphor*, or with an aromatic, in order to insure their good effects.—*b. Aconitum*, in the form principally of extract, was praised by *STOERCK* and *VOGEL*; and was once much employed in rheumatic and chronic headachs. It is certainly often beneficial in these, as well as in the nervous varieties; but it should be given in small doses, and its effects carefully observed. *Aconitine*, the active principle, is to be preferred as an external application, in the neuralgic or rheumatic states of the complaint; but even in these it requires the utmost caution. The powder of the root, or of the leaves, may sometimes be ordered with advantage. I was lately consulted in a case where the incautious employment of *aconitine* caused an apoplec-

* *HUMBERG* prescribed the *cajeput oil* externally; but I have ordered it to be taken internally, and with great benefit.

tic seizure, and hemiplegia. — *c.* *Belladonna* has been used in somewhat similar cases to those for which the *aconitum* has been exhibited. The extract, or the powder of the root or of the leaves, may be given, either alone, or with camphor, or an aromatic. I prescribed it in a case of hypochondriacal headach, with much benefit. — *d.* *Hyoscyamus* has likewise been recommended by STOERCK, RENARD, and others. I have found it of great use when combined as just stated, or when conjoined with *ippecacuanha* and some stimulating antispasmodic, and given in a decided dose. — *e.* *Conium* was directed by LETT-SOM; the distilled *laurel-water*, by J. FRANK; and the *prussic acid*, by GOOD. *Digitalis* is considered by FRANK as very beneficial in the headach proceeding from scrofulous disease. — *f.* *Stramonium* has been prescribed by several writers. I have seen it given with benefit.

57. *E. Alteratives* are required whenever the affection of the head appears to depend upon a morbid state of the secretions, upon impaired action of the chief excreting viscera, or upon an impure state of the circulating fluids. — *a.* Of these, *mercurials* are the most active, and most generally used, both internally and externally, for this complaint. *Calomel* was prescribed largely by WEPFER, VELSCHUIS, BANG, &c. It is most serviceable when the headach depends upon accumulations or obstructions of the bile, and a torpid state of the bowels, and when conjoined with, or followed by, other purgatives. In the rheumatic form it is advantageously conjoined with antimony and opium. The *blue pill* may be prescribed on similar occasions, and in the same manner. The *bichloride of mercury* was preferred by LENTIN, DE MONETA, VAN SWIETEN, and GMELIN, especially in the headaches depending upon organic lesions within the cranium, or upon disease of the bones. In these, as well as in some other cases, it may be prescribed in a tonic tincture or decoction. The *iodide of mercury* may be used in similar circumstances. *Mercurials* were pushed to *salivation* by WILLIS, LENTIN, NÜCK, BANG, DARWIN, and BLANE; but this effect is rarely required unless when the pain resists all other means, or proceeds from a syphilitic taint. — *b.* *Alkalies*, particularly the subcarbonates of soda or of potash (THILENIUS), the solution of potash, or BRANDISH's alkaline solution, are often of service, when given in tonic or aperient infusions or mixtures, and aided by the decoction or extract of *taraxacum*. — *c.* An infusion of two or three drachms of the *clematis vitalba*, in a pint of boiling water, was recommended by STOERCK and MÜLLER, to be taken in the twenty-four hours. — *d.* The decoctions of *sarsaparilla* are more deserving of adoption, and may be made the vehicles for the exhibition of other medicines which produce an alterative effect, as the bichloride of mercury, the hydriodate of potash, the alkalies, the extract of *taraxacum*, &c. — *e.* The *alkaline chlorides* may be also tried. — *f.* The precipitated *sulphur* will be found beneficial in the rheumatic form of the complaint, if taken daily in sufficient quantity to exert a gentle action on the bowels. — *g.* The preparations of *colchicum*, when given in small doses, and conjoined with magnesia, or with *sarsaparilla* and the alkalies, also exert an alterative operation, as explained above (§ 52.); and are of great use in

the arthritic and rheumatic forms of the affection. — *h.* Various *mineral springs* are extremely serviceable; but they require to be appropriately prescribed. Those containing iron, fixed air, lime, or the alkaline carbonates, are most suited to the nervous, neuralgic, rheumatic, and dyspeptic varieties; those holding sulphur, &c., in the rheumatic, arthritic, bilious, hypochondriacal, &c.; and those containing the purgative salts, in the bilious, arthritic, hypochondriacal, &c.

58. *F. Derivatives* — whether those which exert an immediate and brief effect, or those which act more slowly but permanently — are of great benefit in several forms of headach. — *a.* To the former class, *purgatives* may be said to belong; as they not only increase secretion and excretion, but also determine the fluids to the digestive canal. — *b.* *Masticatories* were employed for headaches by CELSUS, ARETÆUS, FORESTUS, MURALT, and many others; but they have now fallen into disuse. Nevertheless, they are frequently of service. — *c.* The same remark applies to *sternutatories*, which have been recommended by the same writers, and have experienced the same fate. The benefit derived from various *cephalic snuffs* is undoubted, even in cases that have resisted other means; and has led to their adoption as empirical remedies, in irregular and domestic practice. They are beneficial in exciting the olfactory nerves, and thereby the cerebral functions, and in procuring a defluxion from the Schneiderian membrane. — *d.* *Warm pediluvia* and *manuluvia* are often resorted to, especially when the extremities are cold, or when the pain depends upon determination of blood to the head. In these circumstances, the addition of mustard and of salt to the water will be of service. — *e.* *Sinapisms*, and *stinging* with nettles, or *urtications*, were employed by the ancients in the treatment of headach. CELSUS, ARETÆUS, and others, directed sinapisms to the head, over the seat of pain; but THEMISON contended for their application to the lower extremities. — *f.* *Blisters* on the nape, sometimes on the extremities, are now more generally prescribed. — *g.* *Setons* and *issues*, in these situations, or in the arm, are commonly recommended in the more obstinate cases of the complaint; and when the pain is suspected to arise from organic lesion. They are praised by RIVERIUS, ZACUTUS LUSITANUS, HOLLER, FABRICIUS HILDANUS, HEISTER, PURMANN, and DE HAEN. I have prescribed them in several cases with benefit. — *h.* The *tartarised antimonial ointment* has also been of advantage when applied on the nape of the neck, and its effects on the integuments fully procured.

59. *G. Topical Means.* — *a.* The application of *cold* to the head or temples, in various modes, has been advised by most writers, when the pain proceeds from determination of blood to, or inflammatory action of, the brain or membranes. A recourse to the *affusion* of cold or tepid water on the head; and the repetition of either, according to the grade of vascular action in it, are often preferable to the continued application of great cold, which is sometimes productive of mischief. Cold sponging, cold lotions, or epithems, wetting the forehead and temples with æther, or with aromatic waters, &c., and the shower bath, are severally of benefit, especially in the plethoric or inflammatory states of the affection; but the *douche*, or

affusion, should be preferred in the congestive form, especially when caused by narcotics. — *b.* Warm applications and warm coverings on the head have been sanctioned by CELSUS, LANGE, and many others. In nervous and rheumatic headaches especially, they are frequently of great service. ALEXANDER TRALLIANUS prescribed them in the form of emollient fomentations. DIEMERBROECK and MARCUS directed fomentations with aromatic herbs; and J. FRANK warm epithems, moistened with a decoction of *verbena* and *betonica officinalis*. Hot *sinapisms* applied over the affected part have been resorted to by some of the ancients (§ 58.). — *c.* Blisters on the head are occasionally of service, especially in the congestive and rheumatic varieties of headache; but they require much discrimination. They have been applied to the scalp by RIVERIUS, SCHRADER, BANG, POUTEAU, AUBERT, MONRO, and others; but, unless in some cases of the varieties just stated, they are more useful behind the ears, where they may be kept open for some time, or often repeated. — *d.* Stimulating liniments (F. 299. 311.), rubbed assiduously on the scalp, are sometimes of service, when cautiously prescribed, in nervous, rheumatic, and neuralgic headaches, or hemicrania. Liniments, also, containing acetate of morphia, or the extract of *belladonna*, or of *aconitum*, or of *hyoscyamus*, or of *stramonium*, or of *opium*, have been advised, by several writers, to be rubbed upon the scalp, in obstinate cases of this kind. I have found them of service in several instances, although it was doubtful whether they, or a full dose of acetate of morphia, given with aromatic spirits, that was also prescribed in some of the cases, had produced the effect. Very recently, ointments, containing *veratria*, *aconitine*, or other acro-narcotic substances, have been directed to be similarly applied in these affections. I have seen benefit derived from them in two or three instances; but I have known others where they either failed in giving relief, or seemed to be injurious. The propriety of having recourse to them is often doubtful. — *e.* The tartarised antimonial ointment may be used in the varieties of headache just mentioned, or even where organic lesion within the cranium is suspected; but the effects of it, as well as of liniments, ought to be carefully watched. — *f.* Frictions of the scalp have been advised by GILBERT and others, and have been of advantage when regularly and assiduously practised. — *g.* Compression of the carotids, although suggested by SERAPION and PARRY, is undeserving of further notice. The same remark is applicable to strait cinctures of the head, advised by some writers. — *h.* The actual cautery, applied to the seat of pain, has been recommended by HIPPOCRATES, CELSUS, ARETÆUS, VELSCIUS, AULAGNIER, VALENTIN, and by other ancient and modern writers. It is, however, reprobated by CÆLIUS AURELIANUS, and is now rarely had recourse to. — *i.* The application of moxas—a modification of this practice—has been long adopted in Eastern countries; and has been advised by PASCAL, SAISSY, LARREY, J. FRANK, and others. WEPFER advises the moxas to be placed in the course of the coronal suture; POUTEAU, on the vertex; and VELSCIUS, on the temples. — *k.* Incisions of the scalp, in the seat of pain, have been directed by LE BRUYN,

SEVERINUS, GRATELOUP, TISSOT, and SUMEIRE. They are more serviceable in disease of the pericranium, or of the bones of the cranium. Issues in the scalp have been sanctioned by PURMANN and many others. I have seen benefit accrue from them in two instances. — *l.* Electricity and galvanism have been recommended by many in headaches; but they produce merely a temporary benefit, and are not always safe. — *m.* Trephining the cranium has been favourably noticed by BAGLIVI, MORGAGNI, MEEKREN, MARCHETTI, VOGEL, SCHMUCKER, and GOOD, and actually practised by some of them. It is only when the pain is very violent, confined to a single spot, has followed an external injury, and resists all other means, that the practice can be entertained. Mr. S. COOPER states, that he has seen two cases, in which the patients lost their lives by this treatment. — *n.* The extraction of carious teeth should not be neglected in hemicrania, or local pain of the head from this cause. In a case where this object could not be accomplished, and in another where it was objected to, I directed a strong solution of the acetate of morphia, to which aromatic spirits were largely added, to be rubbed upon the seat of pain; and complete relief was obtained. The application of *créosote* to the tooth, or of camphor, acetate of morphia, and capsicum conjoined, has also been of service.

60. In the sketch here given, I have mentioned only such means as seem deserving of a trial, or are calculated to be of service in some one or other of the numerous forms and circumstances in which headache is presented to the practitioner. I have furnished suggestions merely; but these will be useful even to the most experienced. The advantage to be derived from them will entirely depend upon the pathological acumen by which their application to particular cases may be guided.

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HEARING — IMPAIRED OR LOST.

CLASSIF. — 4. Class, 1. Order (Cullen).

4. Class, 2. Order (Good). IV. CLASS, III. ORDER (Author).

1. Those diseases of the organ of hearing which are not necessarily attended by impaired function, were considered under the article EAR. At this place, therefore, diminution, or loss of hearing — *Deafness* — will be considered with reference to the lesions which usually occasion it, and to appropriate treatment. The disorders of hearing may be divided into — 1st, *Exaltation of this sense*; — 2d, *Depravation of hearing*; — 3d,

Impaired or lost hearing. — The first of these is merely symptomatic, and is observed chiefly in affection of the brain, and in fevers (see art. SYMPTOMATOLOGY); the second is fully considered at another place (see art. EAR, § 2.); the third only remains for discussion.

2. Before entering upon the consideration of the various lesions causing deafness, directions as to the best mode of inspecting the ear are required, as, unless the auditory passage be carefully examined, the diagnosis of affections of the ear must necessarily be very defective. — In consequence of the curvature of this passage, the bottom of it and the membrana tympani cannot be distinctly seen, unless the patient's head be very much inclined to the opposite side, the ear directed to the sun, or a strong light reflected into it, and the auricle drawn well upwards and outwards, whilst the tragus is pressed outwards. The rays of light may thus be made to fall upon the bottom of the meatus, provided that the external ear be sound. But when it is the seat of morbid changes, a *speculum* is requisite in order to convert the curvature of the passage into a straight line. This instrument should be nearly round, and funnel-shaped, the inside of the arms being blackened, or rendered dim. When the ear is examined with the aid of the speculum, the light of the sun, as recommended by Dr. KRAMER, should be preferred; but the light reflected from a small mirror may be employed.*

3. I. DEAFNESS FROM AFFECTIONS OF THE EXTERNAL EAR. — i. *Diseases of the Auricle*, especially erysipelatous inflammation extending to it, and boils, may impair the function of hearing, but never in a remarkable manner, nor permanently, unless the inflammation has extended to more internal parts; a circumstance which occasionally takes place. Dr. KRAMER notices the occurrence of scirrhus of the auricle, as a cause of deafness; but it is very rarely seen.

4. ii. *Diseases of the Auditory Passage and Membrane of the Tympanum*. — All affections of these parts are either inflammatory, or the consequence of inflammation in some one grade or other, affecting one or more of the tissues in this situation. The fact is ably supported by Dr. KRAMER, who remarks, that the different forms of disease seated in the auditory passage depend upon inflammation of the constituent structures, and they are characteristically defined, as one or other structure is affected. — The effects, therefore, of these inflammations can hardly be considered separate states of disease, unless they continue after the inflammation which caused them has disappeared.

5. A. *Erythematic inflammation of the auditory passage* generally causes accumulations of brownish hard wax, obstructing more or less the

* Writers on the diseases of the ear, with few exceptions, advise various instruments, each finding fault with those proposed by others; each lauding his own practice, and each detracting from the merits (such as they are) of his contemporaries. In this, however, the despised aurists do not stand alone; for all those who take a single organ under their especial protection — and what organ has not been thus distinguished? — belong to the same category, as they are most anxious entirely to appropriate the object of their adoption, and evince the utmost rancour to those who attempt to encroach on their province. Verily, of all empirics, the regular in respect of qualification is the most uncompromising, and the most degrading to medical science and the character of the profession.

function of the organ. It sometimes occurs in persons of a cachectic habit of body, or in conjunction with chronic affections of the skin, and in connection with disorder of the digestive and excreting organs. It is often excited by substances that have passed into the ear, or by neglect of cleanliness, which, however, is not so frequent a cause as is generally supposed; the accumulation of hardened or morbid wax, with increased sensibility, pain, or soreness in the meatus, being the chief indications of the affection. In its slighter states, itching or formication in the passage is only felt.

6. The *Treatment* of deafness from this cause consists chiefly of syringing the meatus with tepid water, and of attending to the digestive and excreting functions, and to the general health. Mr. BUCHANAN recommends a small syringe with a slender point to be employed, fearing that the *membrana tympani* may be ruptured by the quantity of fluid injected, and by obstruction to the counter-current by the point of the instrument being too thick. Dr. KRAMER, however, considers that this precaution is unnecessary, as the membrane cannot be injured by the stream of water, and as the loosened wax will readily flow out with the water. He therefore uses a syringe that will contain an ounce and a half of water, the pipe being three quarters of an inch long, and the opening wide enough for a strong stream.

7. *B. Deafness from inflammation of the follicles of the auditory passage*, seldom is considerable, until the inflammatory action has given rise to some lesion of structure.—*Mucous or catarrhal otorrhœa* (see art. EAR, § 18.) is caused by the affection of these glands. From this inflammation, and from that of the *membrana tympani*, various excrescences or morbid growths in the meatus ultimately proceed. On inspection, redness and partial swelling of the walls of the passage are first observed; and, if the affection continues long, or becomes chronic, excrescences, or polypi, of a soft, spongy, or vesicular appearance, are gradually formed. These are red, sensitive, roundish, pedunculated, and readily bleed when irritated. In some cases, they have a broad hard base, are insensible, and not disposed to bleed. These obstruct more or less the meatus, and impede the functions of the organ. Hardened mucus and wax may also accumulate in the passage, as a consequence of the chronic states of this affection, and of the obstruction caused by these excrescences.

8. The *Treatment* of this disease should be directed according to the method just advised (§ 6.). The extirpation of the fungous growth should be performed; but, as M. ITARD has stated, the deafness may continue nevertheless; for the membrane of the drum may be thickened, or ulcerated, or covered by inspissated secretions; and otorrhœa will often long remain. In these cases, injections of tepid water, or of emollient and diluent fluids; blisters on the nape, and kept open, or setons or issues; and the means advised for the removal of *mucous otorrhœa* (see art. EAR, § 29.) should be prescribed.

9. *C. Deafness caused by phlegmonous inflammation of the cellular tissue* of the passage, rarely occurs: but this affection may be mistaken for the preceding; from which, however, it is readily

distinguished by its rapid course, and termination in abscess,—results never observed in inflammation of the follicles. Owing to the severity of the pain, and other symptoms, it may be confounded with inflammation of the internal ear; but, in this case, the external passage never presents any lesion on inspection, at least at the commencement.—This disease is usually caused by cold or currents of air.—The *treatment* is altogether the same as recommended for *external acute Otitis* (see EAR, § 27.).

10. *D. Inflammation of the periosteum of the passage*, is most common in children of a scrofulous diathesis, and generally occasions caries of the bony structure, which is readily detected with the probe. If exfoliation of the diseased bone occur, and the ulcerated part begins to heal, narrowing or obliteration of the meatus may take place. In these cases, the deafness often depends as much upon congestion of the adjoining parts, as upon swelling and disease of the passage.—Dr. KRAMER advises, in the *treatment*, that, when the parts show a tendency to close, they should be opened up by art, and maintained open by touching them with lunar caustic, throughout their extent. Hearing, however, usually continues very dull, owing to the natural form of the meatus having been lost, and to the membrane of the drum having become thickened.

11. *E. Deafness from disease of the membrane of the drum*.—It has been supposed, that relaxation of this membrane, that too great tension of it, that rupture of it, and that rupture of the tendon of the *tensor tympani*, may severally occasion impaired hearing. CLELAND, SAISSY, BECK, and others, think that these lesions may be produced by violent sneezing, by claps of thunder, by noises of artillery, &c.; but, as KRAMER contends, these suppositions are unfounded; rupture of these parts never occurring unless from inflammation and its consequences. He remarks, that perforation of the membrane is in rare cases met with, little or no mucous or purulent discharge having been observed; but, even in these, upon examination, in a bright sunshine, with the speculum, a viscid, mucous, or puriform matter is always found at the bottom, and the remaining portion of the membrane is seen, reddened, thickened, and opaque.

12. *a. Inflammation of the membrane of the tympanum* most frequently occurs in connection with inflammation of one or other of the structures of the meatus, especially of the follicles. It may, however, take place primarily, and constitute the chief affection. Acute inflammation of this part is not so common as the sub-acute and chronic states; and either, when neglected, gives rise to opacity, thickening, perforation, purulent discharge, fungous or polypous excrescences, &c.; but the chronic states most frequently induce these lesions. In acute inflammation, the membrane is seen, on careful examination, more or less red, rough, swollen, and opaque. It often seems as if covered with small projecting glands or follicles. Sometimes bundles of vessels are seen in it, and the point of insertion of the handle of the malleus cannot be distinguished, Dr. KRAMER states, that inflammation of this part are distinguished from internal inflammations of the ear, not only by the greater mildness of the former, but especially by the changes of

the membrane presented by them from the commencement; whereas, in the latter, such changes cannot be detected early in the disease, however violent the symptoms and attendant fever may be; and occur only in the further course of the malady, when the membrane is about to burst from the pressure of accumulated matter, or has become involved in the inflammatory process. The different grades of this disease have been imputed to *nervous otalgia*, or confounded with it. Dr. KRAMER, however, denies the existence of such an affection. In this he is evidently mistaken (see EAR, § 6.); although it must be admitted, that both this, and other inflammatory diseases of the ear, are often improperly viewed as nervous merely. The hardened secretion in the meatus, to which the more chronic states of inflammation of the membrane have been imputed, is more commonly the result of inflammatory action, than its cause. The disease, in both its primary and its consecutive states, generally impairs hearing more or less.

13. The *Treatment* is the same in this as in the other inflammatory diseases of the meatus; and as directed for *inflammations of the external EAR* (§ 27. 29.). — Dr. KRAMER, however, prefers injections containing the acetate of lead; and pours a solution, varying in strength, from one grain to ten of the salt to an ounce of water, into the diseased ear, twice or thrice a day. Injections of a solution of the nitrate of silver, or of the sulphate of zinc, or of alum, have been also recommended; but unless they be weak, they often occasion pain and irritation in the meatus. A few drops of pyroligneous acid, to an ounce of water, have likewise been used as an injection. Both it, and the superacetate of lead, will effectually remove the offensive odour of the discharge.

14. *b. Deafness from perforation of the membrane of the drum.* — KRAMER states “that many authors, and among them even ITARD, are of opinion that perforation of this membrane does not necessarily weaken the hearing.” Now this not altogether just: for M. ITARD contends, that, when the opening is small, the hearing in some cases is not materially impaired; although in the great majority it is more or less so; but that, when it is considerable, or when a large portion of the membrane is destroyed or detached, hearing is always very much injured. Although perforation of the membrane causes deafness, yet there are states of the ear, and even of the membrane itself, in which *artificial perforation* of it may be attended by some benefit. Such states are, however, few; and the instances of success from the operation have been rare or equivocal.

15. *Artificial perforation* of the membrane was first performed by Sir A. COOPER, many years since; but the circumstances requiring the operation were not fully understood, until explained by DELEAU and KRAMER. The latter of these writers remarks, that Sir A. COOPER supposed perforation of the membrane to be indicated chiefly in cases of obstruction of the Eustachian tube, and in extravasation of blood in the cavity of the tympanum; but, as he appears to have been unacquainted with catheterism of this tube, his diagnosis of the closure of it was altogether uncertain. Even supposing these morbid states actually to exist, they may be treated more

efficiently by introducing the catheter into the tube itself, than by perforating the membrane. ITARD contends, that the operation is admissible only when there is invincible obstruction in the tube; SAISSY advises it only in thickening and hardening of the membrane; and DELEAU recommends it also in this case, as well as in obstruction or obliteration of the Eustachian tube, and in obstruction of the cavity of the tympanum. Dr. KRAMER has recourse to the operation only when the *membrana tympani* is much thickened, quite insensible to the probe, hard as cartilage, and if the hearing is very impaired; but, even in this case, it should be performed only when both ears are affected with considerable deafness, and when the ear to be operated upon does not suffer from any other disease, by which the result might be rendered abortive.

16. II. DEAFNESS FROM DISEASE OF THE EUSTACHIAN TUBE AND CAVITY OF THE TYMPANUM. — I. *Affections of the Tube.* — The Eustachian tube may be obstructed — 1st, By the pressure of tumours in its vicinity; — 2d, By inflammation causing tumefaction of the mucous membrane, effusion, &c.; — and, 3d, By the more remote consequences of inflammation, namely, constriction or obliteration of a portion, or of the whole, of the canal. — Before, however, any of these can be accurately ascertained, it is necessary to have recourse to means of exploration similar to those employed in obstructions of some other canals. The introduction of tubes or catheters into the canal, in order to ascertain the nature of, and to remedy, various affections both of it, and of the cavity of the tympanum, has been resorted to by SABATIER, WATHEN, DOUGLAS, SAISSY, ITARD, and others. Through this tube, lukewarm water was sometimes injected by these writers, in order to judge of the state of the middle ear, according to the sensations produced by it, or by the total absence of sensation. DELEAU and KRAMER, however, rejected the use of water as an injection; and adopted the suggestion of CLELAND, to employ air instead of water, in the investigation and treatment of diseases of the tube and cavity of the tympanum. Dr. KRAMER recommends the usual silver inflexible catheters to be used; and air, compressed in an apparatus he describes, to be injected through it in the following manner: — “After the catheter has been introduced into the tube, and fixed by means of a frontlet, the patient is placed close to a table, on which he leans his elbow, holding with the hand of that side the pipe of the air-press filled with compressed air. The operator then introduces the metal beak of the pipe into the funnel-shaped dilatation of the catheter, applies his ear close to that which is being examined, opens the cock of the machine and listens to the sound, caused by the air rushing into the cavity of the drum. When the tube and cavity are free, the air strikes with an audible shock against the membrane of the tympanum. When the shock is over, or is slight, a blowing or rustling in the ear of the patient is heard, caused by the streaming of the air.” All variations from this sound are morbid, and furnish more or less distinct indications of diseased changes in the organ. If the air-douche does not penetrate to the *membrana tympani*, Dr. KRAMER advises catgut bougies to be used for opening the passage in the tube.

17. *A. Inflammation of the mucous membrane of the Eustachian tube* occasions modified or different results, according to the intensity of the morbid action and the degree in which adjoining parts participate in the disease. — *a. Catarrhal inflammation*, or irritation of the tube, with accumulation of mucus obstructing it, is a not infrequent attendant upon catarrhal complaints, upon inflammations of the throat or fauces, and upon eruptive fevers; the deafness sometimes accompanying these diseases, arising from this affection of the tube. It is most common in moist, cold localities and climates, near the sea coast, and in foggy weather. — The *Treatment* should be directed to the removal of the primary disorder, especially the affection of the throat. If the deafness still continue, astringent gargles containing the sub-borate of soda, or the nitrate of potash, or the hydrochlorate of ammonia, or gargles with the decoction and tincture of bark and muriatic acid, or the internal use of iodine, may be of service. Aqueous injections into the guttural orifice of the Eustachian tube have been advised by SAISSY, ITARD, and others; but DELEAU and KRAMER prefer the air-douche just described, notwithstanding the good effects of these.

18. *b. Deafness from inflammation of the mucous membrane of the tube* may proceed from disease of the throat, or of the proper membrane of the drum; and be complicated with either, or with both these diseases. In the case of its connection with lesion in the cavity of the tympanum, it is either associated with, or has followed, acute *otitis* or *otorrhœa*. But when the inflammation is confined to the guttural part of the canal, deafness is neither great, nor attended by pain in the interior of the ear. The patient hears well at times, but only momentarily. He hears his own voice even worse than that of others; and occasionally has a crackling, gurgling, or detonating sensation in the throat leading to the ear. The diagnosis is still more to be depended upon, if pain or inflammation exists in the throat or fauces, and if the former be increased on gaping or mastication. The chronic states of this disease of the tube are generally connected with syphilis, or with the scrofulous diathesis.

19. *c. The Treatment* of the more acute states of inflammation of the tube should be entirely antiphlogistic. Local vascular depletions; active purgatives, especially calomel with antimony; cooling and detergent gargles, particularly those with the sub-borate of soda, or nitre, or hydrochlorate of ammonia; external derivatives, or the warm or vapour bath, and diaphoretics, are generally required. After vascular depletion, an emetic is sometimes of service; but, as this disease most frequently is consequent upon, or complicated with, an affection of the throat or ear, or occurs in the course of exanthematous fevers, the treatment of it must necessarily depend very much upon the nature and state of the primary or associated malady. When the disease of the tube is chronic, or consequent upon venereal affections of the throat, mercurials, especially the *bichloride of mercury*, gargles containing this substance, or the internal use of the *iodide of mercury*, should be resorted to. In the scrofulous diathesis, the preparations of *iodine* may be tried. In protracted or severe cases, especially when con-

nected with ulceration in the throat, or syphilis or scrofula, treatment is seldom successful, as they have very frequently gone on to the states next to be noticed.

20. *d.* When the inflammation, either from its protracted continuance, or from its extension to the connecting submucous cellular tissue of the tube, gives rise to *thickening of the mucous membrane*, or to *ulceration*, more or less *complete occlusion*, or *stricture*, or even *obliteration of the canal*, may result, especially when an ulcer is seated near the orifice of the tube, and afterwards cicatrises, as in cases of malignant angina, or of venereal ulceration of the throat. It is important to distinguish these lesions from those states of disease which admit of satisfactory treatment. This is to be done chiefly by ascertaining the history of the case: — If the deafness have followed severe affections of the throat, especially that occurring in connection with malignant eruptive diseases, with syphilis, or with scrofula; — if it have continued long, been constant and uninterrupted; — and if it have followed severe *otitis* or purulent *otorrhœa* (see art. EAR, § 10. 18.), — it may be inferred that one or other of the lesions just specified exists. If there be any doubt entertained, recourse to the means of exploration advised by ITARD, namely, by forcing water into the tube; or to that employed by DELEAU and KRAMER, and described above (§ 16.), will establish the diagnosis.

21. Perforation of the membrane of the tympanum has been resorted to by ITARD in cases of this kind; but with very equivocal success. Dr. KRAMER states that he has found them incurable; and that this operation has been of no use in them, as the mucous membrane of the cavity of the tympanum is also diseased. The introduction of catgut bougies into the Eustachian tube has not been productive of any permanent benefit. If obliteration of the canal be complete, the cavity of the drum is always involved in the disease; and, *à fortiori*, perforation of the *membrana tympani*, advised by some writers, can be of no avail.

22. *e. Deafness may depend upon the occlusion of the Eustachian tube by tumours pressing upon its guttural extremity.* — Enlarged tonsils are the most common cause of this form of deafness; but polypous or fungous excrescences, and enlarged parotids, also, not infrequently produce it. In either case, the diagnosis is very easy, and the indications of cure sufficiently manifest. Polypi must be removed by excision or ligature whenever either can be performed. When the tonsils are enlarged, scarifications, astringent and detergent gargles, stomachic purgatives and tonics, the preparations of iodine, and the other means of cure directed for *enlargement of the TONSILS* (see the article), should be prescribed. If the tonsils contain matter, then puncture or incision of them ought not to be delayed. Enlarged parotids, if the affection be chronic, may be treated with iodine, &c.

23. *B. Inflammation of the cavity of the Tympanum.* — The inflammation may affect only the mucous membrane lining this cavity; or it may extend to the submucous cellular tissue, and even to the periosteum. It is generally either acute or chronic; and, in either case, is a severe and often dangerous disease. The symptoms, consequent lesions, and the treatment of this dis-

ease in its various forms, are fully described in the article EAR (see § 14. *et seq.*). As deafness resulting from *purulent otorrhœa*, with perforation of the membrane of the tympanum, or from *disjunction or loss of the small bones of the ear*, or from *caries of the osseous structure*, belong to the more chronic states of *otitis*, and is discussed in the article just referred to (art. EAR, § 19. *et seq.*, and 28. *et seq.*), it is unnecessary to recur to the subject at this place.

24. C. *Deafness may arise from extravasation of blood in the cavity of the drum.*— This lesion is usually the result of external injury, of violent attacks of sneezing, or of constriction of the neck; but it is chiefly caused by the first of these. In cases of this kind, Sir A. COOPER advised perforation of the membrane; but the extravasated fluid will either pass off by the Eustachian tube, or be absorbed. Moreover, the deafness and other unfavourable symptoms existing in these cases, are not so much dependent upon the extravasation in the cavity of the ear, as upon the injury other parts of the organ, or even the brain and its membranes, may have sustained. When, however, blood is effused in the drum, inflammatory action not infrequently supervenes.

25. III. DEAFNESS FROM AFFECTIONS OF THE AUDITORY NERVES. — *Nervous Deafness.*— We can seldom arrive at just conclusions respecting deafness from this cause derived from direct phenomena. We can infer it only from the absence of those deviations from the healthy state that have already passed under consideration. When, in connection with the absence of these lesions, ascertained by a minute examination, and by having recourse to the air-douche, there are indications of disease within the cranium, or of some other malady with which the organ of hearing may be presumed to sympathise, then the existence of deafness from an affection of the auditory nerves may be considered as probable. In such cases, there is impaired or lost hearing, without any organic deviation in the ear; the lesion being either in the nerves, in their expansions in the labyrinth, or in their course thither, or in the brain at or near their origins. It is always difficult, frequently impossible, to determine the situation of the lesion; and still more so to ascertain whether the lesion consist of simply impaired or lost function of the nerves, or of interrupted action, owing to extraneous influences or morbid productions in their vicinity. In all cases, however, the absence of organic change in the ear itself should be previously made out. Dr. KRAMER states that most writers on the diseases of the ear — that SAUNDERS, SWAN, LENTIN, BECK, VERING, J. FRANK, and SAISSY, have been incapable of determining this preliminary part of the investigation; that CURTIS, STEVENSON, and WRIGHT are still worse authorities; and that ITARD and DELEAU are alone deserving of any confidence. Having consulted with M. ITARD, and frequently referred to his writings, I can bear testimony to his science and candour, and to the great value of his contributions to this department of medical knowledge.

26. Dr. KRAMER, with much of the spirit of the craft, but also with the science of the physician, severely criticises the writings of his contemporaries; rejects the distinctions of ITARD, which, however, appear to me more scientific

and correct than his own; and proposes a novel division of nervous deafness, and a new mode of treatment. He divides it into two forms, — the one attended by excitement or erethism — the other by torpor. Noise in the ears is always present in the former, but never in the latter. This symptom is often, however, attendant on very different diseases of the ear, but in a very indeterminate and inconstant manner. To determine, therefore, whether deafness with noises in the ear proceeds from disease in the organ, or from nervous affection merely, minute investigation and the means of diagnosis already mentioned must be had recourse to. But these are also requisite in the torpid form of nervous deafness. Mr. SWAN believes; that many cases, usually imputed to palsy of the auditory nerve, are occasioned by chronic thickening of the membrane lining the cavity of the tympanum, involving the small branches of nerves in this situation. This is not improbable; and, admitting it to obtain, Dr. KRAMER's mode of diagnosis will not always succeed, nor determine the existence or absence of true nervous deafness. On this subject, the views of M. ITARD are more pathological, and less empirical, than those of Dr. KRAMER; and therefore, in the few observations I have still to offer, I shall chiefly follow him.

27. A. *Deafness may proceed from compression of the auditory nerve.*— In most instances, however, this source of the affection cannot be accurately determined. A tumour may be developed, or purulent formations, or extravasated blood, may exist, in the course, or in the vicinity, or near the origin, of the seventh pair of nerves, interrupting the passage of impressions made on the organ to the sensorium; but this condition often can be only surmised. DUVERNEY and SANDIFORT found these nerves pressed upon by tumours; and SEVERINUS observed them surrounded by serum and effused blood.— If the tumour or morbid collection be considerable, then the extension of paralysis to the nerves of vision and of smell may favour the conjecture. BONET mentions a case in which hearing and sight were lost, and on dissection a tumour was found pressing on the nerves of these senses. THOMANN records a similar instance to this. ITARD found, in a man who had lost the hearing in the left ear, small tumours lying on the corresponding side of the cerebellum, and nearly two ounces of a thick fluid in the ventricle of the same side. In cases adduced by LALLEMAND, and in some seen by myself, an abscess had formed in the part of the brain adjoining the ear, and, by pressure or consequent disorganisation, had destroyed the functions of the auditory nerve. (See art. EAR, § 21. *et seq.*)

28. a. The *Symptoms* of deafness from compression of the nerve of hearing are — severe and nearly constant headach, vertigo, noise in the ears, impaired sight, and weakness of the mental faculties, especially of the memory. The progress of this affection is generally very slow, although the internal disease producing it is ultimately fatal. In several instances mentioned by ITARD, it continued some years without materially affecting the general health. In two instances the above symptoms continued upwards of fifteen years. I also have known cases nearly as long protracted

as these. The case is most protracted when it proceeds from a tumour or morbid growth within the cranium.

29. *B. Deafness from palsy of the acoustic nerve.* — M. ITARD supposes that this nerve may be paralysed — (a) by a severe shock or commotion, — (b) by convulsions, — (c) by apoplexy, — (d) by fever, — and (e) from sympathy with some other organ. Without denying the possibility of these causes giving rise to palsy of the nerves of hearing, and even admitting that apoplexy or convulsions and fever will sometimes occasion it, yet the others may seem problematical. — a. It is probable that very loud noises, as a clap of thunder, or the explosions of artillery, may paralyse these nerves, especially as deafness from these and similar causes can be explained only after this manner, when symptoms of inflammation or of congestion of the ear, or of the brain, cannot be detected. M. ITARD believes, that the shock occasioned by falls in the lower parts of the body, or the counter-stroke occasioned in this and other ways, also may paralyse the auditory nerves; but this cause seems more doubtful than the preceding. When deafness has been occasioned by loud noises, hearing often returns spontaneously in a few days or weeks; but if the deafness persists for some months, it is rarely removed by treatment.

30. *b. Deafness sometimes follows convulsions.* — This is most frequently observed in children under four or five years of age. Many of the cases of deaf-dumbness originate in the convulsions occurring during the first dentition. But the deafness may not be the result of the convulsions; both the one and the other more probably being produced by some lesion at the origin of the acoustic nerves, or by effusion into the fourth ventricle, or by some change at the base of the brain, or about the medulla oblongata. When the loss of hearing is complicated with palsy of one side, or of one limb, the nature of the affection may be inferred; but when this is not the case, and when hearing in both ears is lost, the exact nature or seat of lesion can seldom be determined or even surmised. M. ITARD considers deafness occurring in this manner as quite incurable.

31. *c. Deafness from apoplexy* is a frequent occurrence; and may exist in one or both ears. — When hemiplegia has followed the apoplectic attack, the deafness is generally on the same side, and is then incurable; but when the patient is not far advanced in years, and when there has been no consecutive palsy, the affection of hearing may be somewhat ameliorated by the sole efforts of nature, or by the means about to be mentioned; but more frequently, especially in old persons, no advantage accrues to the hearing from treatment. — When deafness occurs early in *typhoid* and *infectious fevers*, it frequently continues after recovery from them. If a judicious application of remedies do not succeed in a reasonable time, and if the affection have been of long continuance, hearing is very rarely recovered.

32. *Treatment.* — When the deafness following these diseases is incomplete, and occurs in young persons, then blisters applied behind the ears, or moxas in the same situation; the vapour of æther, or of camphor; the internal use of stimulants, when there is no tendency to cerebral plethora; and the

use of stomachic purgatives and alteratives, to promote the secreting and excreting functions, may be resorted to; but recovery of hearing in these cases may proceed as much from spontaneous changes in the circulation within the head, and in the state of nervous power, as from the remedies prescribed. (See also § 37.)

33. *d. Deafness is sometimes symptomatic of, or associated with, disorders of the digestive organs.* — In these cases, the affection is generally slight; but it is sometimes very considerable and difficult of removal. Impaired and disordered digestion, deranged biliary secretion and excretion, a foul or loaded tongue, tumid abdomen, a morbid state of the evacuations, and an unhealthy aspect of the countenance and of the general surface, generally characterise this form of deafness. — The *Treatment* consists chiefly in the exhibition of emetics, followed by stomachic purgatives, and in attention to diet and regimen. The purgatives should be often repeated, and sometimes even the emetics ought to be given from time to time. After the secretions and excretions have somewhat improved, tonics and deobstruents, and the preparations of iron, may be prescribed; and be aided by blisters, or moxas applied behind the ears. — The disorder of the digestive organs associated with deafness is sometimes also connected with *difficult dentition*, as justly remarked by NUCK, HESSE, and ITARD; and occasionally the impaired digestive, assimilating and excreting functions, of which deafness is symptomatic, gives also rise to the production of *intestinal worms*. In these circumstances, the indications of cure are manifest. (See DENTITION — *Difficult*; and WORMS — *Intestinal*.)

34. *e. Idiopathic paralysis of the acoustic nerves.* — This affection has been defined by ITARD to be a want of excitability in these nerves — a loss of their sensibility, independently of the circumstances or causes already passed in review. Its existence has been unjustly doubted by Dr. KRAMER. M. ITARD believes, however, that it may be congenital, or supervene at any period of life; but that it most frequently occurs after forty. It is often accompanied with headache, noise in the ears, and mental inaction. Numbness, or want of sensation in the external ear, is sometimes present. M. ITARD has seen the organic sensibility of this part entirely lost in two instances. In old persons, this symptom is often observed in slighter degrees, and is attended by dryness of the meatus. This variety of deafness is generally ameliorated by warm or mild weather, and by loud noises; but, as soon as these cease, the affection returns to its former state. — It is *caused*, as well as aggravated, by mental exertion and fatigue; by masturbation, venereal excesses, and other depressants; by exposure to cold, currents of air, and humidity; and by the depressing passions. Its accession is imperceptible, and its progress very slow. Sometimes it continues long stationary; but it is little influenced by treatment. If the patient, however, be not far advanced in life, some advantage may be derived from blisters applied behind the ears, or from moxas, rubefacients, or stimulants, around the organ, and repeated from time to time; from the vapour of æther, or of camphor, conveyed into the meatus, or into the Eustachian tube; from tonics, with serpentaria, or arnica;

and from the preparations of iron. Electricity and galvanism have been employed in this variety, but with little or no permanent benefit.

35. *f.* Deafness, in its more complete states, may also proceed from *organic changes in the acoustic nerves*. SYLVIVS found them, on dissection, remarkably atrophied; a state probably consequent upon prolonged inaction. ACKERMANN observed them indurated; and MORGAGNI states that, in one case, they were entirely wanting.

36. *C.* *Deafness from Plethora.* — *a.* Congestion of the vessels of the head or of the ear is not infrequently productive of deafness; and this congestion may either be purely local, or connected with a state of general plethora. In cases of this kind, the patient complains of headach, vertigo, throbbing noises in the ears or head, or momentary unconsciousness; which are increased by warmth, by a stimulating regimen, and the horizontal position. This form of affection is most common early in life, and again at middle age, or soon after; and especially in those who are subject to hæmorrhoids unattended by discharge, and in females who have experienced an interruption of the catamenia, or in whom this evacuation has ceased. The strictly local state of the affection may follow suppressed evacuations of various kinds, or repelled eruptions, or even retrocedent gout; and modifications of it are occasionally met with in connection with secondary syphilis, and with herpetic or other chronic eruptions.

37. *b.* The *Treatment* should in great measure depend upon the existence of local plethora or congestion only, or upon this state being associated with general plethora. The pathologist will generally decide correctly in these cases: but when the affection has followed the disappearance of accustomed sanguineous or other discharges or evacuations, spontaneous or artificial; and when the pulse, habit of body, and temperament, indicate vascular fulness; then general bloodletting, repeated according to circumstances, local depletions, purgatives, and external derivatives, low diet, and regular exercise, will generally restore the hearing, if they be decidedly prescribed, and rigorously pursued. Deafness, however, from local plethora, and especially from congestion of the vessels of the organ, is not so easily remedied; and, when remedied, is liable to return. Local depletions, either from the vicinity of the organ, or from the anus, when there is a tendency to hæmorrhoids; blisters applied on the nape, and kept long open, or preferably issues or setons; deobstruent purgatives or aperients, regularly and long persisted in; the warm or vapour bath; and other means calculated to promote the cutaneous functions, and prevent them from being interrupted, will be most serviceable for this form of the affection. If it have followed the suppression or disappearance of some eruption, discharge, or external affection, derivatives to the extremities, &c., sinapisms, blisters, &c., should be resorted to. If it have occurred in connection with secondary syphilis, a mercurial course will remove it, unless organic lesion of the Eustachian tube, or in the cavity of the tympanum, &c., have taken place. When it is associated with herpetic, or other chronic eruptions on the skin, the same internal and external means which succeed in removing

these, will also generally improve the hearing; especially alteratives, purgatives, diaphoretics, sulphureous, fumigating, and other medicated baths, and strict attention to diet, and to appropriate means for improving the digestive, the assimilating, and the excreting functions.

38. IV. DEAFNESS AND DUMBNESS most commonly proceed from acute or chronic *otitis*, in early infancy, giving rise to organic changes in the delicate and complex structure of the ear, especially in the labyrinth, and in the acoustic nerves; or from diseased changes near the origin, or in the course, of these nerves. — When deafness is *congenital*, one or other of these lesions may be inferred to have taken place in the foetus; or the organ, or nerves of hearing, may be considered as having been imperfectly developed in some of their parts. Deafness and dumbness are very seldom remedied, and never if the deafness has been congenital. If the affection has arisen in infancy from disease of the ear, then the treatment may be carefully directed to the removal of the morbid conditions which that disease may be presumed to have occasioned; but the utmost attention must be paid to the history of the case, to the existing state of the organ and of the constitution, and especially to the phenomena connected with the brain and digestive organs. Cases of this kind are rarely treated with success; but, for this very reason, they should be placed under the care of a scientific medical practitioner, and be treated according to general principles, directed to the particular lesions of the organ, and to the pathological states of the system. That these cases ought not to be despaired of, is proved by the instances of success detailed by M. ITARD, in an instructive chapter on the subject.

39. V. OF CERTAIN REMEDIES RECOMMENDED FOR IMPAIRED OR LOST HEARING. — With a desire of restoring the affections of the ear to the care of the regular practitioner, from whom the pretensions and advertising assiduities of empirics have almost entirely removed them, I shall next take a brief survey of the principal remedies employed in the treatment of these affections. And here I may remark, that none but well educated medical men, pursuing other branches of practice, should undertake the management of these disorders; for they, only, are capable of ascertaining the various pathological conditions of which deafness is either an immediate, or a remote and indirect, consequence, and of appropriately prescribing means of cure — of employing these means without risk of injury to the function, or to the organ, or even to the brain, with which the organ is so intimately connected.

40. *A.* *Constitutional Means.* — *a.* *Vascular depletions*, general or local, are necessary when inflammatory action, or general or local plethora, is present. In other circumstances they are inadmissible. — *b.* *Purgatives* are required in similar states; and when deafness is associated with disorder of any of the digestive organs, and with costiveness. They were much praised by DIEMERBROECK, HOFFMANN, and FABER. — They are injurious in purely nervous deafness, unless conjoined with stomachics and tonics. — *c.* *Emetics* have been recommended by STOLL, LAVAUD, and KENNEDY; and are sometimes of service when the hearing is impaired by inflam-

mation of the ear, or by collections of mucus in the guttural extremity of the Eustachian tube, or when the affection is connected with deficient action of the biliary apparatus. In nervous deafness, they are useless, and, when congestion of the brain is present, they may be injurious. —

d. Tonics and stimulants, especially the preparations of cinchona, of cascarilla, of iron, of serpentaria, of arnica, of camphor, of ammonia, the æthers, &c., have been very generally resorted to in nervous deafness, and sometimes with benefit, when judiciously employed. — *e. Alteratives and deobstruents*, especially *mercurials* and *iodine*, or a combination of them, may be severally prescribed when the deafness is dependent upon secondary syphilis, or upon constitutional vice, or is connected with chronic cutaneous eruptions. They may also be tried when thickening of the membranes of the ear, or of the Eustachian tube, or obstructions of the latter by mucus, are supposed to exist. — *f. Salivation* was recommended by DESAULT and ETTMÜLLER, but is requisite only when the affection proceeds from venereal ulceration in the vicinity of the organ. — *g.* The preparations of *squills* internally have been advised by LANGE, when the Eustachian tube is obstructed by mucus; and a course of *dulcamara* by CARRÈRE, when deafness is associated with herpetic eruptions. *Sulphur* and the balsam of sulphur may be prescribed, as directed by RULAND, in these or similar circumstances.

41. *B. Of Local Remedies.* — *a.* Of these the most vaunted are *electricity*, *galvanism*, and *mineral magnetism* — but chiefly by those who are adepts in these departments of quackery. The inutility of, and even occasional risk from, these means have been shown by HALLER, DE HAEN, ZETZEL, FREESE, and TREVIRANUS. Dr. KRAMER has examined the proofs as to the efficacy of *electricity* in deafness furnished by the most respectable of those who have written upon the subject; and has shown that not one case can be said to have been cured, although many have been made worse by it. The opinions of ITARD and DELEAU nearly coincide with those of Dr. KRAMER. Many cases have been published as cures by *galvanism* and *mineral magnetism*; but the improvement, said to have occurred, has continued only as long as the excitement occasioned by the employment of these agents. In most cases, however, no benefit has been derived from them, or it has been apparent only, or has existed merely in the patient's imagination. In two or three instances, patients have conceived their hearing to have been somewhat improved by *galvanism*; but I have observed, that this sense has nevertheless become more and more impaired.

42. *b. Moxas* have been praised by PAROISSE, LODER, and ITARD. Dr. KRAMER is not favourable to them; but the testimony of a person who has a favourite remedy of his own, and finds fault with nearly all other means, should be received with reservation. M. ITARD, whose experience and opinion are equal to those of Dr. KRAMER, are in favour of them, in the cases in which they have been prescribed above. — *c. Issues* and *setons* have been employed by ZACUTUS LUSITANUS, ETTMÜLLER, ITARD, and others, as derivative means. They should be inserted in the nape, or in the arm, in those

states of the affection for which they have been already recommended. They will often prove inefficacious, or even injurious, if resorted to inappropriately; and especially in cases of idiopathic palsy of the acoustic nerves; or in old, enfeebled persons; or when the deafness has been caused by exhausting or depressing causes.

— *d. Blisters*, applied behind and below the ears, and often repeated, or kept open, have been praised by RIEDLIN, LAVAUD, STOERCK, WENDT, ITARD, and others. Dr. KRAMER considers that they, as well as the *tartar emetic ointment*, are indicated only in circumscribed inflammation of the auditory passage and membrana tympani. He prefers the ointment, which he rubs below the mastoid process, to avoid injuring this part. These means, however, admit of a more general application than he has allowed.

43. *C.* — *a. Masticatories* were prescribed in deafness by WEPFER, DIEMERBROECK, STAHL, and MORGAGNI; but they are now entirely neglected. Several states, however, of this affection admit of a trial being safely given to them. —

b. Gargles are amongst the most useful means that can be resorted to in those states of the affection which originate in acute or chronic disease of the throat. And when it is considered how very often inflammations of the ear, and deafness, are caused by lesions of the Eustachian tube, proceeding from the throat and posterior nares, especially during the various forms of cynanche, and in the course of eruptive fevers, the importance of these means cannot be overrated. These applications should be suited to the nature of the affection of the throat: in the more sthenic states of inflammatory action, they should be refrigerant, and contain the nitrate of potash, or hydrochlorate of ammonia, or borax; in the more asthenic forms of affection they may be astringent, tonic, and stimulant, and may also contain either of these, or some other, detergent substances. — When the occlusion of the guttural extremity of the Eustachian tube with mucus is suspected, these salts, especially the last, will be of service; and, when the deafness is in great measure nervous, the tincture of capsicum may be added to these, or to any other form of gargle that may be preferred. — In deafness connected with secondary syphilis (§ 20.), the bichlorate of mercury will be employed, in the form of gargle, with advantage.

44. *D. Drops and Injections*, especially those of a spirituous, irritating, or acrid nature, into the auditory passage, are justly considered by ITARD and KRAMER to be injurious. But various stimulating or rubefacient applications about or below the ear, as garlic, onions, rue, &c., have, according to HOFFMANN, MÜLLER, and others, sometimes been resorted to with advantage in nervous deafness. Dr. TURNBULL recommends ointments with either *veratria*, *delphineæ*, or *aconitine*, to be rubbed around the ear daily; or four or five drops of a spirituous solution of either of these (gr. ij — iv. to ʒss. of spirit) to be dropped into the ear. — Of *perforation of the membrane* of the drum, notice has been already taken. Its want of utility, and the circumstance of its readily cicatrising, have been pointed out by HUFELAND, NAASE, MAUNOIR, ITARD, and KRAMER. — *Douches* of vapour or of water were formerly used in several affections of the ear.

BARTMOLIN, HOFFMANN, and MICHAËLIS, advised warm vapours, containing various stimulating substances, as camphor, æther, &c., to be directed into the meatus. These, however, require much caution and discrimination; but they may sometimes be of service, especially in catarrhal affections of the ear, and in idiopathic nervous deafness. Dr. KRAMER undervalues these and other means, in order to enhance his own remedy (§ 45.).

45. *E. Injections into the Eustachian tube* were first recommended by GUIZOT; but CLELAND, in 1731, first proposed them in a practicable mode, namely, by the nose; and WATHEN long afterwards proved that a favourable result might be obtained from the practice. The injection of fluids into the tube was advised by BUSSON and others, to be performed by filling the mouth with the fluid; and, having firmly closed the lips and nose, by forcing it into the tube.—Air has also been directed to be forced into the tube, by CLELAND and SIMS, in the same way, in order to remove obstructions of it; and the smoke of tobacco has been similarly used, with the intention both of removing obstruction, and of exciting the organ, in nervous deafness, but with very equivocal results: I know one instance in which it proved decidedly injurious. Injections of medicated fluids, of vapour, and of air, into the Eustachian tube, by means of a suitable apparatus, have been severally resorted to by ITARD, DELEAU, and KRAMER.—Besides injecting air as a means of diagnosis, Dr. KRAMER throws into the tube, through a catheter introduced into it, the vapour of *acetous æther*, generated in a proper apparatus, at a summer temperature; but confines the practice to cases of nervous deafness characterised by torpor, or those unattended by noises in the ear. He also aids the local means by remedies intended to improve the constitution, and the digestive and other functions.

46. *F. Russian Vapour Baths* have been much recommended in deafness, especially when it has been supposed to originate in exposure to cold; and warm, or fumigating, or sulphur baths, have likewise been employed in these and other circumstances of the affection. They may all prove injurious in cases connected with congestion in the head or ears, or with general plethora. They are most serviceable when constitutional complaints—especially chronic cutaneous eruptions, or an obstinately harsh and unperspirable state of the general surface—are associated with the deafness; this latter probably depending in part upon a somewhat similar state of the ears to that of the skin and general system. In these cases they should be cautiously employed, vascular determinations to the head or to the ears having been previously removed, and morbid secretions and excretions freely evacuated.

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HEART AND PERICARDIUM—DISEASES OF THE.—SYN. καρδιά, Χέαρ, Χῆρ, Gr. Cor, Lat. Das Herz, Germ. Cœur, Fr. Cuore, Ital.

Περικάρδιον, Gr. Pericardium (from περι, around, and καρδιά, the heart). Péricarde, Fr. Der Hertzbeutel, Germ. Pericardio, Ital.

I. I. INTRODUCTORY REMARKS.—The progress that has been made in the knowledge of the diseases of the heart, may be dated from the appearance of the writings of HARTENFELS, BONET, VIEUSSEUX, LANCISI, and BARBEYRAC, towards the close of the seventeenth, and at the commencement of the eighteenth, century. LANCISI first directed attention to lesions of the valves, and to hypertrophy, of the heart, as causes of sudden death. MORGAGNI, SENAC, MECKEL, JUNCKER, and SPAVENTI, further advanced our knowledge of these diseases; but, from the middle of the last century, when the work of the last-named writer appeared, until the beginning of the present, when CORVISART wrote, this department of pathology was completely neglected. With CORVISART, the recent progress that has been made in it may be said to have commenced. His work was soon followed by that of A. BURNS, by the engravings of BAILLIE, and by the fragment of FARRE, in this country; and by the works of I. WARREN, in North America; of TESTA, in Italy; of KREYSIG, in Germany; and of BERTIN and LAENNEC, in France. Still more recently, the publications of LOUIS, ANDRAL, WILLIAMS, ELLIOTSON, HOPE, STOKES, WATSON, LATHAM, CORRIGAN, BOUILLAUD, and the con-

tributions of many others, have further enriched this department of our science.

2. i. *Of certain Topics relative to the Structure and Actions of the Heart in Health, &c.*

—*a.* The layers of muscular fibres, and their various and tortuous directions, in the different compartments of the heart, require not particular notice here. According to M. GERDY, these layers amount to six in the left ventricle, and only to three in the right; in both auricles, there are two in each. The muscular tissue of the right auricle is less abundant than that of the left, and leaves minute intervals between its fibres, allowing the external and internal membranes to come in almost immediate contact. To this circumstance M. BOUILLAUD imputes the frequent association of inflammations of these membranes. The muscular fibres of the heart are more distinct in the foetus than in the adult; this organ only participates in the general paleness of muscles at that epoch, although it is deeper coloured than they. It is also entirely without fat at this period. In corpulent persons, the external layers of muscular fibres, especially at the base, are covered with fat; which sometimes presents a watery or gelatinous appearance in the cachectic or leucophlegmatic. In old age, the texture of the heart becomes soft and flaccid, and the parietes of the cavities thin. The cavities themselves enlarge, especially the right; and the surface of the organ is charged with fat. —The *chordæ tendineæ*, the whitish zones at the base of the valves forming the contour of the orifices, and the interior of the valves themselves, are principally formed of fibrous or albugineous tissue, which often becomes, especially in the latter situation, the seat of serious lesions, particularly in persons advanced in life.

3. *b.* The internal surfaces of the heart, as well as the parts just named, are covered by a transparent, pellucid, and whitish membrane, resembling the most attenuated serous membranes. It is more delicate in the right than in the left cavities; and the least so in the auriculo-ventricular and arterial orifices. It is readily stained by the colouring matter of the blood, owing to imbibition during certain states of this fluid. It is perfectly smooth and polished; but, in the situation of the orifices, where it is thickest, it often becomes rough or uneven, from chronic inflammation, which most frequently occurs in these parts, and in the valves. It is connected to the fibrous and muscular tissues by a fine cellular substance, which often is thickened or otherwise altered by disease. —This membrane has been appropriately called the *Endocardium* (from *ἐνδον*, within, and *καρδία*, the heart) by M. BOUILLAUD. —It adheres so firmly to the adjoining tissues, that it can be detached only in small pieces; but, in certain diseases, it can be removed in large shreds. At the base of the valves, where the two layers of this membrane separate to receive the tendinous rings bordering the orifices, the *endocardium* and *pericardium* are nearly in contact with each other, or are connected merely by a fine layer of cellular tissue. This state of structure, and its connection with the inclosed fibrous tissue, explain both the frequent coexistence of internal and external inflammation of the heart, and the intimate connection often existing between these inflammations and rheum-

atism. —*c.* Of the *pericardium* it is unnecessary to say more than that it is a serous membrane, forming, as in all other situations, a shut cavity, reflected over the heart, and origin of the large vessels, and over the fibrous bag inclosing this organ. Its free surface is polished, smooth, and bedewed by an exhalation preventing friction, and the production of any sound; but, when it is diseased, morbid sounds, as well as other phenomena, result.

4. *d.* The nerves of the heart have been a subject of interest with pathologists. They are derived chiefly from the ganglia of the great sympathetic, a few only coming from the pneumogastric; but these latter seem rather to inosculate or communicate with the plexuses of the former, than to directly supply the texture of the organ. The cardiac ganglion seems more particularly to preside over the actions of the heart, or to re-enforce with additional energy whatever it may receive from other sources, especially from the centre of the ganglial system, and the other ganglia in the neck and chest. These nerves supply the substance of the heart in two ways: —1st. There are numerous branches which proceed from plexuses directly to the muscular texture, and which, dipping between the fibres, give off minute fibrillæ to the muscular fibres next to them in their descent into the substance of the heart; —2d. A large portion of the cardiac nerves form a reticulum around the coronary arteries. A part of these follow the arteries to their distributions; but before these arteries are ramified minutely, a part of the nerves surrounding them is detached to adjoining tissues, so that all the nerves reticulated around the coronary arteries do not accompany them to their ultimate distributions or terminations.

5. *A.* The Actions of the Heart may reasonably be referred chiefly to the influence which the ganglial nervous system bestows on the muscular structure of the organ. —HALLER attributed them to *irritability*, or a peculiar power inherent in the muscular fibres themselves. But I have contended in several publications, since 1820, that the ganglial system is the source of irritability; and the same view has been more recently adopted, and ably supported, by Dr. FLETCHER. The experiments of WILLIS, HOME, W. PHILIP, CLIFT, BRACHET, and others, show, that the actions of the heart are independent of the cerebro-spinal nervous power, although they are influenced by it. In experiments, which I performed, in 1818, on several species of fish, the heart continued to contract, not only after the destruction of the cerebro-spinal axis, but even for some time after it was removed from the body. Cases, also, have been observed by LALLEMAND, LAWRENCE, and others, of the absence of both the brain and the spinal chord, and yet the circulation continued for a considerable time after birth. An instance very nearly of this kind has very recently been observed by my colleague Dr. SWEATMAN. HUMBOLDT found that the contractions of the heart, even after the removal of it from the chest, were more frequent and forcible, upon the application of the galvanic current to one of the cardiac nerves; and HOME and WEINHOLD obtained nearly similar results from their experiments. In 1820, I repeated these experiments, and the phenomena were the

same as observed by these physiologists. The more recent researches of M. BRACHET show the justness of my views as to the dependence of the heart's action upon the ganglial system, and which were published twelve years before the appearance of his work upon this system. In my publications on this subject, it has been further contended, that *irritability* does not exist as an independent principle, but as one of the vital manifestations of this system, exerted through the medium of muscular or fibrous tissues.

6. *B.* Such, therefore, being the source of the heart's action, the *chief seat of action* requires some notice.—I believe that too much importance has been attached to the auricles, in estimating the motions of the heart; and that the contractile force of these compartments is much less than is supposed. From some experiments I performed about twenty years ago, I concluded that the actions of the heart should be referred chiefly to the ventricles, and agreed with HAMBERGER in allowing them a dilating power; but considered that Dr. CARSON pushed this opinion too far. I further observed, that if the dilatation of the ventricles were a result of a relaxation of their parietes merely, the cavities would not be so quickly and perfectly filled by the mechanical pressure of the blood as they are; and dilatation would be only the consequence of this pressure, and be proportionate to it. But such is not the case; for, on close observation, the dilatation always appears as the cause of the flow of blood. The opinion of M. BOUILLAUD nearly agrees with the above inferences, published by me in 1824. He, however, considers the injecting powers of the auricles to contribute to the dilatation of the ventricles, and attaches too much importance to the elasticity of their muscular parietes in aiding this action. If the contractions of the auricles were as energetic as commonly believed, a valvular apparatus would have existed between them and the roots of the large veins. The actions of the ventricles should, therefore, be viewed in the double light of *energetic contraction*, and *active dilatation*; by means of the former, the blood is propelled along the arteries, and, by aid of the latter, it is drawn into the ventricles, as well as into the auricles, a current from the smaller veins being thus kept up towards the heart. (See *Notes and Appendix to M. RICHERAND'S Elements of Physiology, &c.*, by the Author.)

7. ii. *Of the Weight and Dimensions of the Heart in Health and Disease.*—*A.* It is obvious that no precise idea can be formed as to atrophy and enlargement of this organ, without having previously determined the dimensions and weight of it in health. This M. BOUILLAUD has endeavoured to ascertain. The following results are abstracts of his researches, and are given in the French weights and measures. He considers that the common opinion of the closed hand being the size of the heart of the same person is very nearly the truth; and that the opinions of CRUVEILHIER and LOBSTEIN as to the weight and size of the healthy organ are neither precise nor correct. In fourteen cases—(a) The heart's *medium weight* was 8 oz., 3 dr. (9 oz. 4 dr.), the greatest being 11 oz., and the least 6 oz. 2 dr., but its weight varies with the size of the person; it also is less in females than in males.

The heart cannot be said to have arrived at its full development until 24 or 25 years of age.—(b) The *medium circumference of the heart*, at the base of the ventricles, was 8 inches 9 lines, the least being 8 inches, the greatest being 10 inches 6 lines.—(c) The *medium thickness of the walls of the left ventricle* was $6\frac{1}{2}$ lines, the maximum being 8, and the minimum 5 lines. The *medium thickness of the parietes of the right ventricle* was $2\frac{3}{4}$ lines, the maximum being $3\frac{1}{2}$, the minimum $1\frac{1}{2}$ line. The *interventricular partition* was 7 lines in thickness. The *medium thickness of the parietes of the left auricle* was $1\frac{1}{2}$ line; that of the *right*, 1 line.—(d) M. BOUILLAUD confirms the statement of LEGALLOIS, that the *medium capacity* of the right ventricle is somewhat greater than that of the left; and that of the right auricle greater than that of the left.—(e) The *circumference of the left auriculo-ventricular orifice* is about 3 inches 6 lines; that of the *right*, 3 inches 10 lines; that of the *ventriculo-aortic orifice*, 2 inches $5\frac{1}{2}$ lines; and that of the *ventriculo-pulmonary orifice*, 2 inches $7\frac{3}{4}$ lines.

8. *B.* Of seven cases of *atrophy of the heart*—(a) The *medium weight* was 175 grammes (or scruples = 7 oz. 2 dr. Eng.); the maximum being 200, the minimum 135 grammes.—(b) The different compartments of the organ, in a state of atrophy, generally preserve their relative dimensions. Sometimes, however, the parietes of the ventricles retain their usual thickness, chiefly from contracting on themselves and diminishing their capacity. In atrophy, also, the mean weight of the organ may be much lessened, whilst the dimensions of the whole, or of certain compartments of it, may not be sensibly, or may be only slightly, diminished.

9. *C.* In *hypertrophy of the heart*—(a) The *mean weight* of thirteen cases was 473 grammes (scruples) 5 grains; the maximum being 688, the minimum 338 grammes.—(b) The *mean circumference* of the organ was 11 inches $10\frac{3}{4}$ lines, the maximum being 12 inches, and the minimum 8 inches 10 lines.—(c) The *mean thickness* of the *left ventricle* was $10\frac{1}{2}$ lines, the maximum being 1 inch 1 line, the minimum 7 lines.—(d) The *mean thickness* of the *right* was $3\frac{7}{8}$ lines; the maximum being $4\frac{1}{2}$, the minimum 3 lines. The *mean thickness* of the *left and right auricles* was $2\frac{1}{8}$ lines, and $2\frac{1}{4}$ lines respectively,—that of the *interventricular partition* being $9\frac{1}{4}$ lines.—(e) The *capacity* of the left ventricle was generally more or less increased; that of the right was also increased in one third of the cases. In three instances the capacity of the ventricles was diminished.—(f) The *circumference* of the *left auriculo-ventricular orifice* was increased in three cases, in one of them to 4 inches 3 lines; that of the *right* was augmented in five instances, in one of which it reached 5 inches 9 lines; and that of the *ventriculo-pulmonary orifice* was increased also in five, and reached in one 3 inches 6 lines.

10. iii. *Of the Sounds of the Heart.*—In the article on AUSCULTATION, I stated the received opinions as to the sounds of this organ, and remarked that the subject required further investigation. Since that time, several able inquirers have entered upon it, and may be said to have settled the question. HARVEY and

HALLER described the contractions of the auricles as preceding those of the ventricles. This, the true view of the matter, was departed from by LAENNEC, who conceived that the contractions of the auricles followed those of the ventricles. The researches of TURNER, CORRIGAN, WILLIAMS, HOPE, and BOUILLAUD, have shown the inaccuracy of LAENNEC's opinion. Dr. WILLIAMS, especially, has assiduously investigated this subject; and, as his inferences have been upon the whole confirmed by the committees of the British Association, I shall follow him chiefly in the few remarks which remain to be made respecting it. — 1st. The contraction of the ventricles, following immediately that of the auricles, is accompanied by the *first* or *dull sound*. This *systole*, by straightening the anterior convexity of the ventricles, brings the apex of the heart into forcible contact with the ribs, and thus produces the *impulse* or shock. The *systole*, by throwing an additional quantity of blood into the arteries, causes the arterial pulse, which is synchronous with the *systole* in arteries near the heart; but, in those more distant, succeeds it at an interval occupied by the transmission of the wave through the blood along the elastic tubes from the heart. — 2d. The *systole* of the ventricles is immediately followed by the *diastole*, which is attended by the *second* or *short sound*. — 3d. There is afterwards an interval of *rest*, at the conclusion of which the auricles contract, and the series of motions is repeated as before. The points which here remain to be settled are — (a) the way in which the *systole* of the ventricles produces the first sound; and (b) how the *diastole* causes the second.

11. The *first sound* was ascribed, by Mr. CARLILE, to the rush of blood into the great arteries; by M. ROUANET and others, to the closing of the auriculo-ventricular valves; by Dr. HOPE, to the collision of the particles of fluid in the ventricles; and by Dr. WILLIAMS, to the muscular contraction itself. — The *second* or *short sound* was ascribed, by Dr. HOPE, to the impulse of the blood from the auricles re-filling the ventricles; by CARSWELL, ROUANET, CARLILE, BOUILLAUD, and others, to the suction of the ventricles causing the elevation of the sigmoid valves, and to the reaction of the arterial columns of blood against these valves. The experiments performed by Dr. WILLIAMS, assisted by Dr. HOPE and several other able physiologists, in order to determine these points, proved, that the *first sound* is produced by the muscular contraction of the ventricles; and that the *second sound* is caused by the reaction of the arterial columns of blood tightening the semi-lunar valves at the diastoles of the ventricles. — Dr. WILLIAMS, Dr. HOPE, and M. BOUILLAUD, concur in considering the *impulse* or stroke of the heart to be effected by the apex alone; whilst the experiments of the Dublin Committee seem to show that the body of the ventricle is also concerned in producing it. The London Committee admit that the first sound is caused by muscular tension, but think that the impulse may be an accessory. In other respects they all tolerably agree.

12. iv. *The morbid Actions and Sounds of the Heart* have been very fully considered in the article AUSCULTATION (§ 25.). Little, there-

fore, remains to be noticed respecting them at this place, beyond a brief mention of the views of some writers of eminence that have appeared since that article was published. — A. As may be expected, *à priori*, the duration of the *systole* seems often to be prolonged by the difficulty experienced by the blood in passing through the morbid arterial orifices. Continued and violent palpitations, particularly in cases of hypertrophy, tend eventually, according to the observations of M. BOUILLAUD, to produce marked prominence of the præcordial region. I have remarked this, also, in cases of sub-acute and chronic pericarditis. In a case of pericarditis, complicated with rheumatism of the joints, in a child seven years of age, who was long under my care, this prominence and the palpitations were remarkable; but, after a time, these disappeared, and the lower half of the sternum, with the cartilages of the ribs, became drawn inwards, and towards the spine, to such an extent as to form a very remarkable cavity in the præcordial region. This occurrence was so singular, that I caused the patient to be shown to several of my colleagues at the Middlesex Hospital. It appeared to have arisen from adhesion of the pericardium to the heart, and from the subsequent atrophy of the latter.

13. B. *The intensity of the sounds*, as well as of the impulse of the heart, varies remarkably. — In some instances the sounds are feeble, and heard with difficulty; whilst in others they are heard at a distance of two or three feet. Although the impulse against the ribs does not produce either of the natural sounds, yet, in violent action of the heart, the more sudden and abrupt strokes cause a sound, constituting the termination of the first sound in these cases, and which seems nearer the ear, and more like a knock, than what is heard in the ordinary action of the heart. The sounds may assume a dry or hard character, which BOUILLAUD imputes, but I think incorrectly, to hypertrophy and rigidity of the mitral valve; or they may be large, hoarse, or rough, owing, as he thinks, to a fungoid or infiltrated condition of the valves, which are then soft and flaccid. — The saw sound sometimes has a peculiar *hissing* character, and at others a thick or *rough tone*; but all these are merely modifications of the bellows-sound, and are very commonly connected with narrowing of the orifices of the compartments. LAENNEC considered them to proceed from spasm, of the existence of which, however, we have no satisfactory proof. — A sound, which varies in tone from the *cooing* of a dove to the *chirping* of birds, or the *sibilous* noise of bronchitis, is more rarely heard: I have heard it only twice. It has also been noticed by M. BOUILLAUD, ROUANET, and, I believe, by Dr. WATSON. It seems connected with narrowing of the orifices. I heard it in a case of rheumatic pericarditis in a child. — The *bellows*, or *blowing sound*, M. BOUILLAUD asserts, has been heard in upwards of a hundred cases, where contraction of the orifices, with induration of the valves, was established by dissection; whilst M. PRIORRY states, that his experience is at variance with this result. An able reviewer (*Brit. and For. Med. Rev.* No. ii. p. 451.) very justly remarks, that, although cases of well-marked contraction, with ossifications, &c., do present themselves, unaccom-

panied by any such abnormal sounds, such occurrences are extremely rare, and form only the exception, and not the rule, as M. Piorry would have them to do. It should also be kept in mind that the morbid sounds may be produced by a reflux, as well as by an onward motion of the blood, as M. Filhos has contended.

14. M. BOUILLAUD considers that the *bellows sound* may proceed from — 1. Narrowing of the orifices, with induration of the valves; — 2. Smallness of the aortic orifice, although the valves are quite healthy; — 3. Polypous exudations, resulting from acute inflammation of the endocardium; — 4. Irregularity or roughness of the surface of the valves, or vegetations, or calcareous incrustations on them; — 5. Infiltration of the valves from inflammation; — 6. Adhesions of the auriculo-ventricular valves to the adjacent parietes; — 7. Dilatation of one or more of the heart's orifices, with consequent inefficiency of the valves; — 8. Hypertrophy, with dilatation of the left ventricles, although unattended by narrowing of the orifices; — 9. Chlorosis, anæmia, and nervous affections of the heart, in some instances; — 10. Extreme debility from hæmorrhage, or other depressing causes. It has been supposed that the bellows sound, which is not constant, or is only occasional, in the three last circumstances may arise from spasm. M. BOUILLAUD believes it to depend in these on a narrowing of the orifices, to adapt themselves to the diminished quantity of blood circulating through them. He further considers that all the above cases are reducible to one common principle, namely, increased friction produced in some of them by the direct, in others by the reflux, current of the blood; but most frequently from the former cause. From this it is evident — and most experienced practitioners must have arrived at the same conclusions, from their own observations — that it is impossible to decide, from the bellows sound alone, in which of the orifices, if in any, the lesion is seated. The co-existence of this sound with the systole or diastole, and the situation in which it is loudest, may assist the observer, but still no accurate conclusion can be formed as to its precise cause. — When the *sawing* or *rasping* sound is heard, the alteration may be considered to partake more or less of an osseous nature.

15. C. The sounds produced occasionally by the surfaces of the pericardium in a state of disease, were overlooked by LAENNEC, and have only recently received attention. It is chiefly to COLLIN, REYNAUD, HONORÉ, STOKES, WILLIAMS, MAYNE, and BOUILLAUD that we are indebted for observations respecting them. M. BOUILLAUD divides these sounds into three varieties. — 1st, The *rubbing sound*, resembles that caused by rubbing together two pieces of silk, or of parchment. It is to be distinguished from a similar sound produced by the pleura, by its being double and synchronous with the heart's action. It is most obvious in the systole, and is diffused over a considerable surface. — 2d, The *creaking sound*, is altogether similar to the creaking of leather, or of shoes, or of a saddle. M. BOUILLAUD remarked it once; M. ANDRAL only once, and Dr. WILLIAMS in three cases. M. COLLIN and others have also heard it. I have met with it in two instances: one of them a boy, about ten years of age; the other a young lady of about

twenty, who, in 1833, came from Brompton to consult me. She had, several months previously, experienced an attack of acute pericarditis; and, whilst describing her symptoms to me, she herself likened the morbid sound she heard in the præcordial region to the creaking of new shoes. I heard it distinctly with the unassisted ear. — 3d, The *scraping sound*, is such as may be expected to be produced by rubbing a rough and hard cartilaginous or osseous body against the pericardium. Its synchronism with the motions of the heart distinguishes it from similar morbid sounds originating in the pleura. M. BOUILLAUD states, that the two first sounds occur only in acute pericarditis. In the two instances I met with, there had existed the acute form of this disease; but it had long before subsided, leaving after it organic lesion, or at most a chronic state of inflammation. The friction, or rubbing sound, in its faintest states, occurs in the early stages of acute pericarditis, and whilst the membrane is dry. The creaking or leathery sound seems to arise from thickening or condensation of the subserous and serous tissues of the pericardium, especially of the portion reflected over the heart; and the formation of a dense and elastic false membrane, with, perhaps, more or less adhesion of the opposite surfaces. The scraping or grating sound is caused by lesions which occur only in the more protracted cases of chronic pericarditis. — When the bellows sound is heard in pericarditis, it does not necessarily depend upon this disease, but rather upon the coexistence of inflammatory action in the internal membrane of the heart, or the extension of it to the fibrous structure of the orifices or of the valves, and the consequent contraction or other lesions thereby occasioned.

16. v. *Percussion of the Cardiac Region* is best performed with the index finger of the unemployed hand as the medium, or plessimeter. In the healthy state, the extent of the dull sound generally varies from an inch and a half to two inches square, which answers precisely to the extent to which the heart is disengaged from the lungs. The extent of the dullness increases very much in hypertrophy of the organ with or without dilatation of the cavities, in simple dilatations, and in congestions of them occurring in various diseases. It is not unusual to find the dullness, in these circumstances, extending to five or six inches square. (See art. AUSCULTATION.)

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II. A GENERAL VIEW OF DISEASES OF THE HEART. — SYN. *Kαρδιά νόσοι*, Gr.; *Cordis Morbi*, Lat.; *Herzkrankheiten*, Germ.; *Maladies du Cœur*, Fr.; *Malattie del Cuore*, Ital.; *Diseases of the Heart*, *Heart-Diseases*.

17. As the various maladies of the heart frequently proceed from the same causes, often are met with in similar states of complication or association, admit often of the same prognosis, and even frequently require the same modes of treatment, I shall, in order chiefly to prevent repetitions, take a general view of them before I proceed to consider their specific forms.

18. i. The *Causes of Diseases of the Heart* are even more diversified than was supposed by CORVISART and some other writers. — A. The *Predisposing Causes* are nearly the same as those concerned in producing inflammatory and nervous diseases in other organs; but the unceasing actions, and the intimate sympathies, of this viscus, not only increase the general predisposition, but also serve to impart a peculiar character to the effects more immediately produced on it by numerous physical agents and moral influences. — The irritable, nervous, and sanguineous temperaments; a plethoric habit of body; the rheumatic and gouty diathesis; depression of mind; and the puerperal states, favour more or less the occurrence of diseases of the heart. LANCISI, ALBERTINI, SENAC, MORGAGNI, CORVISART, BOUILLAUD, and others, have remarked an hereditary predisposition to these diseases, independently even of either of the diatheses just particularised. Besides these, susceptibility of the nervous system, whether original or acquired; and pre-existent disorder, especially debility in its various forms; impaired digestive, excreting, and assimilating powers; morbid states of the blood, affections of the lungs and liver, and irritations of the uterus and spinal chord, predispose more or less to these maladies.

19. B. The *Exciting Causes* may be arranged into — 1st. The Mechanical and Traumatic; — 2d. The Physical; — 3d. The Moral; — and, 4th. The Pathological. — a. Under the *first* of these may be arranged blows, falls, wounds, and external injuries, directly or mediately affecting the organ; compression of the ribs or sternum, or of the hypochondria, by resting against a desk, and by strait lacing; and over-distension of the stomach by food or drink. — b. Amongst the *physical causes*, may be enumerated — great muscular exertion, especially while the breath is retained; long journeys on foot, and fatigue; running against the wind, or ascending eminences or stairs; reading or speaking aloud, and singing, especially if long continued, or when empasioned; blowing wind instruments; straining at stool; advanced pregnancy; excessive venereal indulgences; the abuse of spirituous or fermented liquors; arsenical preparations in poisonous doses, or employed too long or in too large doses as a

medicine; the injudicious use of other acrid substances; exposure to cold, or to cold and humidity conjoined, and to currents of cold air; wearing damp linen or clothes, or sleeping in damp beds or sheets; and drinking cold fluids, or eating ices when the body is perspiring. — c. The *moral causes* comprise all the depressing and exciting affections of mind, especially when excessive, but more particularly the former. Sudden shocks, fright, terror, violent fits of anger, anxiety, grief, sadness, nostalgia, amorous affections — all not merely affect the functions of the heart in a very remarkable manner, but sometimes also alter its structure.

20. d. The *pathological causes* are still more influential than the causes already enumerated; and act in different ways. — 1st. Some of them embarrass the actions of the heart, by impeding the functions of the diaphragm and lungs, as flatulent distension of the stomach or colon; enlargement of the liver, or of the spleen, and effusions of fluid in the large cavities. — 2d. Others obstruct the circulation through the lungs, and consequently cause congestion or distension of the heart's cavities, as asthma, whooping cough, pneumonia, bronchitis, convulsions, &c. — 3d. Certain pathological states extend to the heart or pericardium from other parts, owing either to proximity of situation, or to their structure being of the same kind as that of the parts previously affected. — Thus inflammation of the external or internal membrane, or other diseases, of the heart, appear in the course, or after the subsidence, of pneumonia, of pleuritis, of rheumatism, &c. — 4th. Some of these causes are connected with excessive vascular plethora, with or without a morbid condition of the circulating fluids, as the suppression of eruptions or discharges, and interrupted or impeded action of any of the principal assimilating and excreting organs. That the blood may become morbid, owing either to the imperfect assimilation and the injurious nature of the ingesta, or to the accumulation in it of the ultimate products and effete principles of assimilation requiring to be eliminated by the energetic action of the emunctories; and that this state of the blood may excite disease in some part of the heart's internal surface, seem more than probable. — The changes in the circulating fluids, moreover, taking place in the course of fevers, or in connection with the exanthemata, erysipelas, gout, &c., may also occasion disease of this organ; and it is not unreasonable to infer, that, when this connection is observed, as much is often owing to the morbid condition of the blood, as to that of the living solids. — 5th. In cases of suppression of gout or rheumatism, or the retropulsion of the exanthemata, and of other acute cutaneous eruptions, it may be admitted, that whilst the constitutional disturbance, upon which the local or external affection depends, remains unabated, the suppression of the latter will very probably be followed by some prominent affection, or localisation of morbid action, in an internal organ, especially if the powers of life are inadequate to throw it off upon some external part; and as, in these diseases, the circulating fluids are more or less altered, and the actions of the heart already much disturbed, one or other of the tissues or compartments of this organ will be quite as likely to become the seat of the superinduced

malady, as any other internal part; and even more so, as respects rheumatism, owing to the predisposition arising out of identity or similarity of structure.—6th. One affection of the heart, functional or structural, may occasion another, or an additional lesion. Thus violent palpitations sometimes rupture a muscular column, or tendon, of the valves, or even the parietes of the heart itself; and narrowing of an orifice occasions dilatation of the cavity behind it, &c.

21. Whilst CORVISART and SCHINA have attached the greatest share of importance to moral causes in the production of cardiac diseases, and undervalued the influence of physical agents, M. BOUILLAUD has over-estimated the latter, at the expense of the former; and they, as well as all other writers, have either entirely overlooked, or have scarcely adverted to, several of the antecedent changes, or pathological states, to which I have imputed so much in the causation of these maladies.

22. ii. *Of the Seat and Anatomical Characters of Diseases of the Heart.*—A. It is extremely rare, as M. BOUILLAUD remarks, to find the heart altogether diseased; most commonly a compartment only, or a portion of it merely, or even one of the tissues constituting it, is affected. Sometimes one or more valves, or orifices, are primarily altered; and in other cases, either the internal or external membrane, or the muscular structure, is changed. In one instance, a cavity is dilated, and its walls thinned; in another, it is of natural capacity, but its parietes are remarkably thickened; and in others, the compartments individually present various lesions, as softening, hardening, &c.

23. B. The *intimate nature* of the heart's lesions is not always evident, even on the most minute examination. That they are frequently inflammatory, or of that kind usually so denominated, cannot admit of doubt; and that they still more frequently are the consequences of inflammation in some one or other of its grades, modified, however, by the tissue in which it is seated, by the state of vital power attending it, and by the condition of the circulating fluids, is not less true, although less manifest, than the former proposition. Inflammation affecting a serous surface gives rise to results varying with its intensity and with the state of the constitution, in respect both of organic nervous energy and of vascular tone. When the latter remain unimpaired, the production of coagulable lymph is a common result; but the lymph, being secreted in a fluid state, will often, when the internal membrane of the heart is inflamed, be washed into the current of the circulation before it can be coagulated, and no very manifest evidence of the disease may be detected after death, although it has existed in its most intense form, or even has been the cause of death. When the inflammatory action is co-existent with depressed vital power, and a morbid state of the blood, the fluid secreted by the inflamed surface is incapable of coagulating, and it readily mixes with, and contaminates, the vital current; the seat of disease presenting after death but little change, beyond dark discolouration, and softening. In respect both of the internal surface, and of the substance of the heart, lesion of the capillary action and tone, as well as of vital cohesion, may have existed during

life, and yet escape detection after death; and certain of the changes sometimes observed—especially alterations of colour, fibrinous coagula attached to the valves, &c., and slight effusion into the pericardium—have either taken place shortly before, or at the period of, dissolution, or even soon after this issue.

24. Although most of the affections and lesions of the heart are to be imputed chiefly to inflammatory action and its consequences, varied by the conditions alluded to, yet they are not altogether of this nature, or do not always originate in this way. We have seen above (§ 5.), that this organ derives its energies chiefly from the ganglial nervous system; it must, therefore, follow that extreme depression or exhaustion of this system must be attended by a marked alteration of the functions of the heart; indeed, the evident imperfection of the actions of the latter is one of the principal indications we possess of the exhaustion of the former. And, if this alteration or imperfection of action continues long, or returns frequently, lesion of structure, especially dilatation, softening, thinning, atrophy, &c. of the parietes of one or more of the compartments of the organ, &c., must ultimately take place. Nor is this the only mischief; for, along with it, alteration of the circulating fluid often exists,—this latter still further impairing nervous or vital power,—and, in connection with both these pathological conditions, inflammatory action, or an altered state of vascular action constituting one of the morbid conditions usually so denominated, occasionally also takes place in the internal surface of the heart, or in some other of its constituent tissues, giving rise to the further changes already alluded to in general terms, and hereafter to be more particularly noticed.

25. iii. *The general Characters and Diagnosis of Diseases of the Heart*, naturally divide themselves into—1st. The *Local Signs*; and, 2d. The *general Symptoms*, or sympathetic phenomena. The former have been generally termed *physical*; the latter, *physiological* and *rational*: but the one class should always be considered in connection with the other in the course of practice.—A. The *local signs* are ascertained by *auscultation*, *percussion*, *inspection*, and *palpitation*. Of the former of these means, sufficient notice has been taken. (See arts. AUSCULTATION, and CHEST.)—The latter requires equal care with the former; and the sensations communicated to the hand of the examiner, as well as those excited in the patient by the examination, should be attentively ascertained and estimated. The indications furnished by these means are diversified according to the nature of the diseases which furnish them; but they can be known only by listening to the extent, seat, and nature of the sounds given out by the organ, or elicited by percussion; by observing the form and motions of the præcordial and adjoining regions; by feeling the motions, tremors, or thrills, often existing in these situations; and by ascertaining the sensations of the patient upon pressing between the ribs, or on the præcordia, or upwards upon the diaphragm, and under the anterior margin of the left floating ribs.

26. B. The *general symptoms*, or sympathetic phenomena, are ascertained from attentive observation of the several related functions.—The very intimate relation of the heart to all the

principal viscera, but especially to the blood and circulating vessels, to the organic or ganglionic nervous system, and to the respiratory organs, and the influence which these exert upon this organ, and which it exerts upon them, severally and conjointly, require to be kept in view. The manner, also, in which the brain, the liver, and other digestive organs, are often affected by diseases of the heart, may likewise be made a source of information. Most of the connections which have been traced between affections of distant organs and the heart, have been imputed to augmented or impaired actions of the latter—most frequently to hypertrophy. But there is sufficient evidence to prove that interrupted circulation, caused by alterations of the valves or of the orifices, is much more concerned in the production of sympathetic disturbance, and even of structural lesion, of remote as well as associated parts, than hypertrophy, or excited action. An impeded passage of blood from the auricles occasions congestion of the venous system; serous effusion into shut cavities, and cellular or parenchymatous structures; hæmorrhages from mucous surfaces, or into the substance of organs; and not infrequently congestions or enlargements of the liver or spleen. When hypertrophy exists, it is generally caused by the increased action required to overcome an obstacle situated at the outlet from the hypertrophied compartment; yet still the obstacle is but imperfectly overcome, and the force of the current of blood beyond the seat of obstruction is even less than in health. The necessity, therefore, of ascertaining the pathological states of remote as well as of collatitious parts, in connection with the actions and sounds of the heart, in order to arrive at correct conclusions as to the diseases of the latter, is manifest. The relations of morbid actions must be duly estimated, without assigning a preponderating or an exclusive share to one or two conditions, and overlooking all the rest. No partial or empirical views should be entertained; and far less ought a charlatan-parade of examination be pursued and acted upon, to the neglect of physiological inquiry, and of rational deductions. There is as much empiricism at the present day in the modes of investigating and observing diseases, as in those of curing them; but there is this difference—that the empiricism of the former kind is much more *ad captandum* than the latter, and generally more fussy, and often more offensive.

27. iv. *Of the Nature and Arrangement of Diseases of the Heart.*—A. The nature of these diseases has been partially noticed, when viewing the alterations of structure attending or consequent upon them (§ 23, 24.). Of the intimate nature of these maladies we know nothing more than is intimated by function or action, or is made apparent on close inspection.—a. When disordered action is suddenly excited by mental emotions, or by affections of related parts, and as suddenly ceases, leaving the organ in the integrity of its functions, we infer that the disturbance is seated in, or extends to, that part of the organic nervous system which actuates it; and this view is confirmed by the *juvantia* and *lædèntia*, and often by the appearances observed after death in persons who had been thus affected, and who had died of other diseases. In these cases, the disorder must, in the present state of our

knowledge, be viewed as purely *functional*, or *nervous*, or *dynamico-vital*, as termed by various writers; and it may, without much stretch of ingenuity, be chiefly referred either to impaired action, or to excessive action. In these affections, the nervous system of organic life—particularly that part of it supplying the heart—is primarily disordered, and continues the only or chief seat of the disturbance for some time. But if either affection be excessive, or enduring, then alteration of structure may result, and assume one or other of the forms about to be noticed.

28. b. Diseases of a most serious nature often attack the heart, in which, conjointly with more or less disturbance of the organic nervous influence, the vessels supplying one or more of the constituent tissues of the organ, exert a morbid action, and give rise to various changes of structure, according to the grade of vital power, and to the state of the blood. These diseases frequently take place less obviously, or much more insidiously, than the foregoing, although often, also, in a severe and acute form; and they are always dangerous. The rapidity of their course, as well as the changes they produce, depends upon the intensity of the morbid vascular action, and the constitutional states just mentioned. From the circumstance of this action being attended by injection and development of the vessels, particularly of the capillaries, and giving rise to changes usually observed to follow inflammation in other parts similarly constituted, it has been denominated inflammatory. By this term, however, it is not intended to be implied that the morbid vascular action altogether consists either of diminution, or of augmentation, of the vital properties of the vessels; but that, as I have contended in the articles DISEASE (§ 87.), and INFLAMMATION, it is rather an *alteration*—a *perversion* of these properties that constitutes inflammation, and not a change simply *dynamic*; this change, whatever direction it may take, forming only one of the elements of the morbid state. Beyond this, we can hardly advance in our analysis of the nature of inflammatory diseases of the heart; but we may infer, with some truth, that, when the organic nervous or vital powers are unimpaired, and the blood uncontaminated, the morbid vascular action will partake more or less of the excited or sthenic condition, will exert a formative process, and will most probably form lymph, which will coagulate if allowed to remain for any time in contact with the part which produced it; or occasion thickening, or a condensation of the affected parts; or give rise to other changes varying with the grades of action;—and we may further conclude, with equal justice, that, when the vital powers are depressed or exhausted, or the blood altered or contaminated, the local morbid action will be asthenic, will be incapable of developing the changes just specified, and, in their place, will produce, according to its seat, a sanious or sero-sanguineous fluid from the surfaces, that will further contaminate the blood, if the internal membrane be implicated, or give rise to softening, discolouration, &c. of the substance of the organ, if this part become affected.

29.—c. Under the above two heads may be comprised those affections of the heart which may be said to be primary, as respects this organ, although they are often associated with, or even

preceded by, disorder of other viscera, as well as by alteration of vital power and of the circulating fluids. But there is another class of cardiac diseases, which present different characters, and consist, in a great degree, of change of structure, often associated, however, with disorder of the organic nervous influence, and sometimes also with more or less marked alteration of vascular action in one or more of the constituent tissues, or compartments, of the heart. They may be said to proceed from the morbid conditions already discussed, especially when these exist in sub-acute, or in slight or chronic forms. That this is the case, will become apparent, when I come to describe them individually. It will then be fully shown, that impaired, or irregularly exerted, nervous influence, and morbid vascular action, in one or more of the constituent structures of the organ, have, together or singly, altered their nutrition, or impaired the vital cohesion of the molecules of which they are formed; and that the consequences of altered nutrition and impaired vital cohesion chiefly consist of the increased or diminished thickness and density, the augmented redness and elasticity, the softness, the dilatations, &c., of the parietes of the cavities; and of the fungous or polypous excrescences, the cartilaginous and osseous formations, and the different morbid productions, &c., found in the heart and pericardium.

30. *B. Conformably with the above view of the nature of affections of the heart, I shall divide them into — 1st. Disorders which are merely nervous, or functional, and chiefly dependent upon the state, or distribution, of the ganglial nervous influence, particularly in respect of this organ; and under this head will be comprised — (a) Impaired and irregular actions of the heart; — and, (b) Excessive action of the heart. —*

2d. Diseases in which, conjointly with more or less disturbance of the organic nervous influence distributed to this organ, the blood-vessels of one or more of its constituent tissues manifest a perverted or morbid action. Under this division will be considered — (a) Inflammation of the endocardium or internal membrane of the heart; — (b) Inflammation of the pericardium; — and, (c) Inflammation of the substance of the heart, or carditis. —

3d. Organic or consecutive lesions of the heart, resulting from, and often associated with, one or more of the above pathological conditions. Under this head will be discussed — (a) Atrophy of the heart; — (b) Œdema of the organ; — (c) Softening and hardening of the structure; — (d) Adventitious productions in the heart; — (e) Changes of the dimensions of the orifices and valves; — (f) Changes in the dimensions of the cavities of the heart; — (g) Hypertrophy of one or more of the compartments; — (h) Rupture and wounds of the heart, &c. &c.

31. *v. Of the Course, Termination, and Duration of Cardiac Disease. — Affections of the heart may be acute, sub-acute, or chronic. — A. Those which are nervous, or functional, are most frequently chronic, remittent, or even periodic; yet they are sometimes acute, and of very short duration, as in cases of cardiac syncope, &c.; and frequently terminate without any lesion of structure, although they occasionally induce it. — B. Inflammations of one or more of the constituent tissues of the heart may assume any grade of intensit, and pursue accord-*

ingly an acute or chronic course, or even any of the intermediate or sub-acute states. The chronic form may be consequent upon the acute; or it, as well as the sub-acute, may appear primarily, especially when the inflammatory action is limited in extent, or is confined to a single constituent tissue of the organ. Although they may terminate in resolution, yet they most commonly give rise to organic changes, amongst which must be ranked the effusions of fluid, &c., frequently met with in the pericardium. — The more intense states of inflammation of either of the surfaces, or of the substance of the organ, may terminate fatally in two or three days, whilst the less severe or chronic states may continue months, or even years. But when they become thus prolonged, it is generally owing to their having passed into organic change, or to a temporary subsidence of the morbid action, and to returns or exacerbations of it, under moral or physical influences. — C. Organic lesions of the heart are extremely uncertain as respects their course, duration, and termination. Even when most manifest and extensive, their symptoms and progress are by no means uniform; the most distressing phenomena, as in inflammations of the organ, often varying, disappearing, returning, or pursuing very different courses, in separate cases, or even in the same person at different periods. They frequently, also, present more or less evident remissions and exacerbations, or even a marked periodicity. This circumstance probably induced CORVISART, and especially ROSTAN, to refer many cases of nervous asthma to organic disease of the heart. But this circumstance is explained by the fact already adverted to — that change of structure, even when most prominent, is only one of the elements of the cardiac malady, the organic nervous energy of the organ being also always more or less affected; and we know that intermittence, or periodicity, is characteristic of affections of the nervous system. — The exacerbations or violent paroxysms which patients with organic lesions of the heart experience, is not, however, altogether owing to periodicity of the morbid action, but is often excited by mental emotions, by errors in diet, by over-distension of the stomach or colon, by neglect of the excreting functions, and by exposure to atmospheric vicissitudes.

§2. *vi. The Complications of Diseases of the Heart, are important objects of consideration, in respect both of the associations of these diseases with one another, and of their connection with other maladies. — A. Nervous affections of the heart are often attendant upon disorders of the digestive organs, on flatulency, on congestions of the liver, and on disorder of the respiratory functions. They are frequently also observed in the course of chlorosis, hysteria, and anæmia; and are often excited by affections of the womb, and by the puerperal states. Indeed, the numerous pathological causes (§ 20.) of cardiac diseases form also complications with them. — B. Acute or chronic inflammation of the internal membrane of the heart sometimes extends to the pericardium; and inflammation commencing in the latter surface very frequently reaches the former. This association of inflammation of both surfaces, or extension of the morbid action from the one to the other, especially from the external to the internal membrane, is to be explained by the*

proximity of the one to the other in certain parts of the organ, and by the circumstance of the connecting cellular substance being frequently implicated, especially when the pericardium is inflamed. This fact, which is much insisted upon by BOUILLAUD, has been taught in my lectures since 1825. — *C.* Inflammations of these membranes are also often complicated with, or consequent upon, acute articular rheumatism, or inflammation of the pleura or lungs. This association is met with in a very large proportion of cases of these diseases. — *D.* The complication of *organic lesions* of the heart with those of the large vessels, and particularly those of the aorta, are well known; and of softening, dilatation, &c., with adynamic fevers, scurvy, purpura, &c., has been often remarked. The connection existing between obstructions at the orifices of the heart, and commencement of the large vessels, and hypertrophy; and between these and diseases in the lungs and brain, especially apoplexy, palsy, pulmonary hæmorrhage, effusion into the cavities of the chest, anasarca, &c.; will be more fully shown in the sequel.

33. vii. *The Prognosis of Cardiac Diseases.* — SENAC and CORVISART entertained the most unfavourable opinion as to the result in diseases of the heart. The latter writer even affixed the epigraph — “*Hæret lateri lethalis arundo*” — to the titlepage of his work. At the present day, more favourable ideas are entertained on this subject, although the opinion of CORVISART will still hold with respect to some of the organic changes of the organ. — *a.* The *nervous affections* of the heart will frequently yield to treatment, unless they be very violent, when an unfavourable, or at least a guarded, prognosis should be given. — *b.* *Inflammations* of the membranes, and even of the substance of the heart, if they come early under treatment, will often terminate favourably; yet they ought, nevertheless, to be viewed as very dangerous maladies, as respects both the organic lesions they may cause, and the contingency of an immediate or sudden dissolution. — *c.* Most of the *organic lesions* of the organ are incurable; and yet the patient may live many years, when judiciously managed. — Of this kind are, induration of the valves, narrowing of the orifices, chronic pericarditis, hypertrophy, &c. — The unceasing functions of the heart, and their extreme importance to the economy, however, render diseases of it more dangerous than those of almost any other organ. But the advances that have been recently made in their diagnosis, have given greater precision to the treatment, and have consequently afforded a greater degree of success, than formerly.

34. viii. *The Treatment of Cardiac Affections.*

— *A.* The *nervous affections* of the heart, especially those associated with disorder of the digestive and assimilative organs, or characterised by irregular or excessive action, have been too generally, and most injuriously treated, by vascular depletions and purgatives. I have seen even the complication of palpitation with chlorosis treated by depletions, and a complete state of anæmia result. In cases of this kind, a judicious selection of tonics, chalybeates, anodynes, and stomachic aperients, appropriately to the peculiarities of each, aided by light, nutritious diet, by gentle exercise in an open dry air, and some-

times by tonic and alterative mineral waters, will generally remove the complaint.

35. *B.* The *inflammatory diseases* of the heart require more or less copious and repeated depletions, — in the acute stage, the most decided adoption of them, as well as of other antiphlogistic means. — M. BOUILLAUD has strongly insisted upon the propriety of prescribing repeated bloodlettings; but, although the depletions he recommends are considered large, in France, they are not larger than those usually directed in this country for the same diseases. The exhibition of calomel and opium, or of calomel, antimony, and opium, in repeated doses, to promote the resolution of the inflammatory action, or to prevent it from passing into the chronic state or from terminating in effusion, or to limit the effusion of lymph, or to prevent the organisation of what may have been effused, and promote its absorption, is the next most important means, and should always follow immediately after a decided vascular depletion, in the manner described in the article BLOOD (§ 64—68.). — This practice, somewhat modified from that adopted by British medical practitioners in warm climates, was first brought into use in this country, by Dr. HAMILTON, of Lynn Regis (*Medical Comment*, &c. vol. ix. p. 191. Lond. 1785.). His paper on this subject — the most valuable in modern medical literature — contains all the modifications that have been attempted in this practice, by Dr. ARMSTRONG and other more recent writers, with the view of appearing original. It has been erroneously stated, by several who have adopted this treatment, that Dr. HAMILTON always prescribed these medicines until the gums were affected by them; and it has been claimed as a point of originality, that they have employed the same means so as not to produce, or short of producing, this effect. In some complaints, however, and even in some of those under consideration, this effect is necessary to the successful operation of these substances. That Dr. HAMILTON, however, thought it unnecessary to employ them, in certain diseases, as rheumatism, &c., so as to affect the mouth, is shown by his remarks respecting their operation (*Opus citat.* p. 200.). He there states, that when they act upon the skin, or bowels, relief will accrue from them without the mouth becoming affected; and that, when the skin is dry, hot, or contracted, emetic tartar should be added to the calomel and opium, in order to determine to this surface.

36. When inflammations of the heart come under treatment at a more advanced stage, or when they have assumed a more chronic form, vascular depletions must be prescribed with greater caution, and the calomel and opium should be given, until either the gums become affected or a slight pyalism be produced. If the action of the heart be irregular, or excited, a small quantity of camphor may be added to each dose of these medicines; and, if the pulse be hard and regular, a repetition of the bloodletting, and a combination of James's powder or of tartar emetic, or of ipecacuanha, with the calomel and opium, will act beneficially, both upon the circulation, and upon the emunctories. The bowels should be kept freely open, and the action of aperients be promoted by enemata.

37. Although it is necessary to have recourse

to copious depletions in the acute or early stage of inflammations of the heart, yet their effects should be carefully watched; and they ought to be still more cautiously employed in chronic or advanced cases; for there are very few inflammatory diseases, in which they may prove more beneficial, than in these, if they be resorted to at the proper time, and in sufficient quantity; or in which they may be more injurious, if too long delayed, or too sparingly employed, or carried too far. When prescribed in a timid manner, and if a decided use of calomel and opium, sometimes with antimony, colchicum, or other adjuvants, be not adopted, an acute inflammation, which would otherwise have entirely subsided, either passes into a chronic state, or gives rise to organic changes embittering the shortened period of future existence. Yet, whilst thus prompted to decision, it must never be overlooked, that in most cases of inflammation affecting this viscus, the organic nervous energy is more or less impaired or irregularly determined; and that the most decisive measures should, therefore, be directed with the utmost circumspection. The other means which may be brought in aid of those already noticed, are comparatively of so little importance, and require to be so varied according to the forms and stages of the disease, that no mention need be made of them until the specific affections of the organ come under consideration.

38. *C.* The organic lesions of the heart require a much more prudent recourse to depletions than the diseases just dismissed, inasmuch as the nervous influence, especially that actuating the organ, is much more impaired, in the former maladies than in the latter. In cases of dilatation of one or more of the cavities, even a moderate depletion may be followed by a fatal result; and when there is hypertrophy, the heart requires all the energy it possesses to overcome the obstacle in the way of the circulation. The small but repeated depletions, and the antiphlogistic regimen, recommended by VALSALVA and ALBERTINI, and so generally adopted in organic diseases of the heart, may be carried too far, as CORVISART has judiciously shown. They may be even most injurious. There are few means which are universally, or even generally, applicable to these lesions, excepting mental and physical quietude, and attention to the digestive and excreting functions. Vital energy seldom admits, in them, of being lowered; and whatever acts in this manner, should be employed with discrimination, or appropriately to those states which seem specially to require it.—In them, also, moral training, attention to diet, living in an equable temperament, and in a healthy and airy situation, a gently open state of the bowels, and a due secretion of bile, and the careful avoidance of whatever excites or aggravates the disorder of the heart, are amongst the most generally applicable means of treatment. Numerous other measures may be employed, but they are applicable only to particular lesions, and therefore will be mentioned where the treatment of these lesions is particularly discussed.

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III. OF NERVOUS OR FUNCTIONAL AFFECTIONS OF THE HEART.

i. OF IMPAIRED OR IRREGULAR ACTION.— CLASSIF. I. CLASS, III. ORDER (Author).

39. DEFIN.—The action of the heart more or less weakened or irregular, with faintness, or depression, and often with disorder of the digestive organs.

40. The functions of the heart may be imperfectly performed in two principal ways;—1st. They may be simply weakened, but in every grade, until they become extinct, and yet structural lesion may not be detected to account for

the circumstance.—2d. They may be impaired or enfeebled, with more or less irregularity of the contractions, and yet no organic change may exist; the impaired and irregular action occurring only temporarily. One of the most familiar forms in which this affection presents itself, is that of fainting or syncope. But in this the heart is not always primarily affected.—*A. Simply Enfeebled Action of the Heart*, depending upon deficient energy of the cardiac ganglia, may proceed from whatever depresses the organic nervous influence, or from inanition or anæmia. It may also be sympathetic, or the result of a derivation of the vital influence to different organs, as during certain periods of impregnation. The causes, pathological states, the diagnosis, and treatment of this affection, are fully described under the article *Fainting*.

41. *B. Enfeebled and Irregular Action of the Heart*, is a common affection in its slighter grades.—The pulsations may be unequal, in frequency and power, or they may be intermittent, reiterated, or fluttering. This state of action, although attending various dangerous diseases of the organ, may be entirely nervous, or connected with depressed organic nervous power, and enfeebled function of the stomach and liver. In this latter case especially, it is often induced by flatulence, particularly when the flatus rises into the œsophagus and is retained there by spasm of the canal. It also may proceed from mental emotions, or from whatever overloads the cavities of the heart, or interrupts the return of blood from the lungs, or causes congestion of the left auricle and pulmonary veins.

42. *C. Treatment*.—Unless it is attended with a sense of sinking, or oppression, or anxiety, at the præcordia, this affection requires only attention to the digestive, assimilating, and excreting functions, and to diet and regimen. But if these symptoms are present, restoratives, especially camphor, the preparations of ammonia, the æthers, carminatives, and tonics conjoined with either of these, will often be necessary. Much advantage will also result from taking a digestive pill (F. 507. 562.) at dinner or bed-time. A small or moderate bloodletting is not infrequently prescribed in cases of this kind, with the view of removing congestion of the heart or large vessels. When the patient is plethoric, or when the irregularity is consequent upon the suppression of an accustomed evacuation, or of congestion of the portal system, this practice is judicious, if cautiously resorted to. In the latter circumstances, the application of a few leeches around the anus will often be of service. The bowels ought also to be freely acted upon by deobstruent and mild purgatives. In these cases, although there may be vascular plethora, or local congestion, nervous or vital power is at the same time more or less impaired, and therefore the means of restoration just mentioned should also be employed. The treatment about to be advised for palpitations (§ 50.) is often also appropriate in this affection.—When enfeebled and impaired action of the heart occurs in gouty persons, or appears as *misplaced* or *retrocedent* Gout, the means advised under such circumstances in that article (§ 83. 89.) should be prescribed.

ii. *Excited Action of the Heart*.—*SYN.*

Καρδιαγγμός, Hippocrates, Galen; *Cordis Palpitatio, seu Pulsatio, Palmus* (παλμός, a beating or palpitation); *Cardiopalmus*, Swediaur; *Tremor Cordis, Palpitatio*, Cullen, et Auct. var.; *Palmus Cordis*, Young; *Clonus Palpitatio*, M. Good; *Palpitation, Palpitation du Cœur*, Fr.; *Das Herzklopfen*, Germ.; *Palpitazione*, Ital.; *Palpitation, Palpitation of the Heart*.

CLASSIF.—2. Class, 3. Order (Cullen).

4. Class, 3. Order (Good). II. CLASS, I. ORDER (Author).

43. *DEFIN.*—*Strong, frequent, or tumultuous action, with an increase of the impulse and natural sounds of the heart, so as to be sensible, and often distressing, to the patient, without appreciable lesion of the structure of the organ.*

44. *A. Palpitations* are either *nervous* or *functional*, or *symptomatic* of some one of the more serious diseases of the heart, hereafter to be considered. The former only of these fall under discussion at this place.—*Nervous palpitations* may be either *primary*, and depending upon excitement of the nerves of the heart, without manifest disorder of other viscera, as in attacks induced by moral emotions; or *sympathetic* of affections of remote or related organs. They are often sudden in their accessions, but more rarely so in their subsidence. The sounds of the organ are generally increased during their continuance; and the first sound is further augmented by the impulse or shock against the ribs, occasioning a distinct knock, which may be sometimes heard at a short distance from the patient. They are also occasionally attended by a slight bellows sound, which always disappears when the heart resumes its natural action. *Nervous palpitations* are often accompanied with uneasiness and slight anxiety at the præcordia; and sometimes, also, with a sense of sinking, or faintness, with which they not infrequently alternate.

45. *B. The Causes* differ much in their natures, or modes of operation; and modify accordingly the characters of this affection.—The nervous and irritable temperaments, early age, debility, in whatever way induced, venereal excesses, and mental exertion, remarkably *predispose* to this disorder.—The *exciting causes* are—1st. The more active mental emotions, as fright, anger, joy, &c.; also sadness, anxiety, melancholy, nostalgia, longings after objects of affection, excitements of the imagination, &c.;—2d. The abuse of spirituous liquors, and muscular exertions, or whatever accelerates the return of blood to the right side of the heart, and over-distends the large veins and auricles;—3d. Excessive or debilitating discharges; the abstraction of a natural or necessary stimulus; sexual excesses, or manustupratio; this last being the most common and influential of the exciting causes;—4th. Inanition, from deprivation of the necessary nourishment, or from impaired assimilation, or from excessive waste of the secretions, or circulating fluids, as in the palpitations associated with chlorosis and anæmia, or consequent upon depletions;—5th. Pressure on the large vessels, occasioned by strait lacing, by pregnancy, by abdominal tumours, effusion, &c.;—6th. Enfeebled action of the digestive functions, particularly when attended by flatulency and torpor of the liver, or constipation of the bowels;—7th. The irritation of worms in the intestinal canal, in connection with debility, &c.;—8th. *Hysteria* in

several of its Protæan forms, especially when the uterine functions are disordered, and the catamenia either excessive or obstructed; — 9th. Irritation of the spinal chord, or of its nerves, or excitement of the uterus or ovaria acting upon the heart, either directly by the great sympathetic nervous system, or mediately through the spinal chord; the irritation propagated to this latter being reflected from it along the branches communicating between it and the cardiac and other sympathetic ganglia.

46. Although these may be considered the principal causes, yet others sometimes produce functional palpitation; especially several *antecedent disorders*, and organic lesions, as — *a.* Adynamic and nervous fevers; — *b.* General plethora by overloading the auricles and large vessels; — *c.* Irregular, or misplaced gout, occasioning irritation of the cardiac nerves, or congestion of the large vessels or cavities of the viscus; — *d.* Obesity, particularly in connection with plethora; — *e.* Obstructed circulation through the lungs, owing to diseases of their structure, or to effusions of fluid pressing upon them, or other causes preventing their expansion; — *f.* Enlargements of the abdominal or pelvic viscera, or effusions into the peritoneum, preventing the easy descent of the diaphragm, or pressing upon that part connected with the pericardium, as enlarged or engorged liver or spleen, pregnancy, ascites, &c.

47. *D. Course and Duration of Nervous Palpitation.* — *a.* This affection varies somewhat according to the cause which produced it. — *α.* When it proceeds from *mental emotions*, it is often violent, but of very short duration. — *β.* When it arises from *manustupratio*, it is not so excessive, but it is more prolonged; or remittent or recurrent. — *γ.* Palpitations *sympathetic of dyspepsia* are seldom severe, unless in persons of the nervous or irritable temperaments, nor of long duration; but they are readily excited, particularly by a full meal, or by indigestible, or flatulent, or fluid food. In such cases the action of the heart is irregular, as well as excessive, tumultuous or fluttering, and attended by anxiety, sometimes by pain, and by accelerated breathing or dyspnœa. — *δ.* When this affection proceeds from *misplaced, or retrocedent gout*, it is generally severe; more, however, from the attendant sensations, than from the violence of the palpitations. The action of the heart is excessive, most irregular, or tumultuous, and attended by distressing anxiety, or sense of sinking or of anguish at the præcordia often extending to the epigastrium, and by extreme restlessness, and a feeling of impending dissolution. — *ε.* Palpitation is very often *attendant of hysteria*; and in this case is excited or aggravated by the globus hystericus, or by the borborygmi or intestinal flatulence, characterising the latter affection. A feeling of strangulation frequently accompanies this form of palpitation; and, in two or three instances, I have observed an almost sudden swelling of the thyroid gland to take place, this part returning to, or nearly to, its former state very soon after the attack. In more than one of these cases, there was evidence of co-existent irritation or excitement of the uterine organs. Hysterical palpitation sometimes alternates with faintness, or is connected with excessive menstruation. It occasionally also follows abortions, floodings, &c. — *b.* The *Duration of*

palpitation is most indefinite. It may continue only a few minutes, or many days. It may be remittent, intermittent, or even periodic; but its course is more generally irregular.

48. *E. Diagnosis.* — It is often easy to distinguish nervous palpitation from that symptomatic of organic lesion; but quite as often the diagnosis is very difficult. That it should be made with accuracy is most important, as respects both the treatment, and the immediate happiness of the patient; for many distress themselves and aggravate their complaints with fears of an organic malady, whilst they are affected only with functional disorder. When nervous palpitations are prolonged, remittent, or return frequently and are severe, the diagnosis is generally difficult: if attempted during their continuance, it is still more so; and if deferred until the period of intermission, it is often not much less difficult; for some organic lesions occasionally present periods, in which the symptoms are remarkably ameliorated. Yet an attentive examination of the whole chest by percussion, auscultation, by the eye, and by the touch, will generally determine the question with great accuracy, and show that, in this affection, the heart is not enlarged, and that the blood circulates freely through its various orifices. The extended dulness on percussion, the morbid or adventitious sounds, the more or less constant dyspnœa, the venous congestions, the bloated state of the countenance, the dropsical effusions, &c., sufficiently mark organic lesion of this organ, especially if it have become far advanced. Sometimes, however, great nervous sensibility, or an hysterical affection, may be attendant upon some degree of alteration of structure; the palpitation recurring in severe paroxysms after slight mental emotions, or other causes affecting the nervous system, and leaving the patient comparatively easy, and with few precise or well-marked symptoms in the intervals. This is not infrequently observed in persons who have been subjects of inflammation of one or more of the constituent tissues of the heart, that has left behind it slight structural change in connection with an irritable state of the organ, and great susceptibility of the nervous system.

49. In addition to these considerations, the following circumstances may be adduced as distinctive of a functional disorder: — 1st. The general prevalence of nervous symptoms, and the recurrence of the attack from causes acting on the nervous systems; — 2d. The return of the affection when the patient is quiet, and the relief following gentle or moderate exercise in the open air, and the means used to improve the digestive functions and to restore the nervous energy; — 3d. The prolonged and complete intermissions during an improved state of the general health, and the exacerbations consequent upon whatever depresses or exhausts organic nervous power, especially upon the operation of any of the causes enumerated above (§ 45, 46.); — and, 4th. The absence of the physical signs characterising any of the inflammatory and structural diseases about to be considered.

50. *F. Treatment.* — *a.* The means prescribed for this affection should have a very strict reference to the causes which produced it, and especially to the pathological state of which it is

sympathetic. If it be independent of vascular plethora, or of disease of remote organs—if it be primary and the consequence of enfeebled or exhausted nervous influence, or of *inanition, anæmia, chlorosis*, &c.—chalybeates, tonics, and restoratives, regular exercise in the open air, change of air to the seaside, the use of the tepid or cold bath, sea-bathing, light and nutritious food, an infusion of green tea*, early hours, and healthy employment, the bowels being regulated, or preserved open by an occasional dose of a mild stomachic purgative, or by a tonic, carminative and purgative conjoined, are the most appropriate remedies.—For persons who are of an irritable or nervous temperament, or who cannot bear the immediate use of chalybeates, the stomachic bitters, or vegetable tonics, with the alkaline subcarbonates, or the preparations of ammonia, will be most serviceable; and afterwards quinine with sulphuric acid, and æther, or with camphor; or the decoction of bark with the hydrochloric acid and chloric æther; and, lastly, the metallic salts, especially the sulphate of zinc, or of iron, or the nitrate of silver; may be prescribed. I have for many years employed the nitrate of silver triturated with the extract of hyoscyamus with great benefit in this affection, as well as the sulphate of zinc similarly combined. The various strengthening mineral waters, and amusements in the open air, will also prove beneficial.

51. *b.* When palpitation proceeds from *mas-turbation*—a more prevalent vice than is generally supposed—the preparations of iron, with camphor; the tincture of the muriate of iron; the tonic infusions or decoctions, with the alkaline subcarbonates, with the solution of potash, or with BRANDISH'S alkaline solution; soda water or Seltzer water, as a common beverage; early rising, and regular exercise in the open air; will be found the most useful means of cure; but they will all fail if the cause still continues.—*c.* Palpitation in connection with *plethora* requires a moderate bloodletting, which may be repeated in some instances; a restricted and chiefly farinaceous diet, and the daily use of stomachic or mild purgatives, early rising, and regular exercise. This form of the affection is not uncommon during the early months of *pregnancy*, and may be treated by the means just named.—*d.* When this affection is symptomatic of *dyspepsia*, the treatment must depend upon the state of the vascular system. If this system be plethoric, then the remedies now specified should be prescribed, the excreting functions freely acted upon, and the biliary secretions promoted. (See INDIGESTION.)—*e.* The palpitations arising from *gout*, are generally relieved by

camphor conjoined with acetate or muriate of morphia, or with hyoscyamus, and by a copious action of the bowels procured by warm stomachic purgatives, with which magnesia or the alkaline subcarbonates may be conjoined. In this, as well as in the dyspeptic form of palpitation, I have seen much benefit accrue from the hydrocyanic acid, given three times a day, in a tonic infusion, an absorbent and carminative tincture being added; but the bowels should previously be well evacuated. (See art. GOUT, §86.)

52. *f.* *Hysterical palpitations* require, according to the degree of plethora, or of inanition, nearly similar means to those already mentioned, and attention to the uterine functions. The bowels should be kept open by cooling aperients; and, if there be much debility, tonic infusions, with the muriate of ammonia, or nitrate of potash, or subcarbonate of soda; the infusion of valerian, with the foetid spirit of ammonia, &c.; and other remedies enumerated in the article HYSTERIA; may be directed, according to the pathological peculiarities of the case. The existence of pain or tenderness in any part of the spinal column should also be ascertained in this form of the affection; and, if either be present, the means calculated to remove it ought to be resorted to.—*g.* When palpitation depends upon *chlorosis* or *anæmia*, a combination of the sulphate of iron with aloes, and an aromatic powder in the form of pills, is generally of service. I have seen great benefit derived from one or two grains of the sulphate of iron, with three of the aloes and myrrh pill, and an equal quantity of the extract of conium, given twice or thrice daily. The formulæ, also, in the *Appendix* (F. 519—525.), will prove equally serviceable.—*h.* In the palpitation connected with *chronic bronchitis*, or with *asthma*, an infusion or decoction of senega, with aromatics and anodynes; camphor, assafoetida, and other remedies advised in these articles; are indicated.—*i.* When this affection is caused by *intestinal worms*, or by *enlargement* of any of the *abdominal* or *pelvic viscera*, or by *ascites*, or by *effusion* into the *pleural cavities*, the treatment should be chiefly directed to the removal of these maladies.

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* In the summer of 1820, I was requested by a practitioner to see the daughter of a clergyman, residing in Westminster, labouring under most violent nervous palpitations, which had resisted the means advised by several physicians who had been consulted. She was in bed; and the impulse of the heart moved the bedclothes, so that the pulse could be counted by the eye at the furthest part of the room; and the knock of the heart against the ribs could be heard at the distance of some feet. She was thin, delicate, and highly nervous. Finding that the usual remedies for nervous palpitation had been prescribed without any relief, I suggested that a strong infusion of *green tea* should be given three or four times a day, and continued for a few days. Relief immediately followed, and perfect recovery in two or three days.

t. i. n. 8. (*Nitre with tonics.*) — *Laennec*, Auscult. Médiate t. ii. p. 227. Paris, 1829. — *A. Portal*, Mém. sur la Nature et Traitement de plusieurs Maladies, t. iv. p. 173. Paris, 1819. — *Merat*, in Dict. des Sciences Médicales, t. xxxix. p. 134. — *J. Johnson's* Med.-Chirurg. Rev. vol. iv. p. 370., vol. v. p. 277. — *Andral*, Dict. de Médecine, t. xvi., 8vo. Paris, 1826. — *J. Frank*, Praxeos Medicæ Universæ Præcepta, vol. ii. pars ii. sect. ii. p. 370. — *J. Hope*, Cyclop. of Pract. Med. vol. iv. p. 232. — *J. Bouillaud*, Traité Clinique sur les Mal. du Cœur, t. ii. p. 486.

iii. PAINFUL OR NEURALGIC AFFECTIONS OF THE HEART. — CLASSIF. II. CLASS, I. ORDER (*Author*).

53. CHARACT. — *Sudden attacks of anguishing pain in the cardiac region, returning at intervals; the actions and sounds of the heart, and respiration, being but little affected.*

54. In the same category with the disorders just considered may be arranged those painful affections which have been considered as neuralgia of the heart. They might be viewed as modifications of ANGINA PECTORIS, and arranged with it, if there were sufficient evidence to prove that they are actually seated in the nerves of this organ. But, as BOUILLAUD observes, although the functions of the heart may be disordered in connection with them, the nerves of the adjoining viscera and structures are probably as much affected as those of the heart. A case of this complaint has been described by Dr. ELLIOTSON, and is altogether similar to some that have occurred in my practice. Indeed, *neuralgia* of the cardiac and communicating nerves, or affections intermediate between it and *angina pectoris*, are by no means rare. A case of this affection came under my care in 1821; and since then I have treated six similar cases: two in females between the ages of twenty-five and thirty, three in gentlemen somewhat upwards of fifty, and a sixth in a physician of about thirty-five years of age.

55. A. *Diagnosis.* — According to the phenomena observed in these cases, this complaint is characterised as follows: — A most acute, lancinating, and anguishing pain is felt to the left of the sternum, darting through the region of the heart, often from under the left nipple backwards to the spine or left shoulder-blade. Sometimes it is confined to this organ; and occasionally it extends to the left brachial plexus, and up the left side of the neck, or left arm, or to other parts in the vicinity of the heart. This complaint is generally intermittent, or remittent, or even periodic in its character; the paroxysms are sudden or almost instantaneous in their accession; and their duration is very variable. They leave the patient intervals of comparative ease, when the pain is dull or aching, and confined to the region of the heart. They return at various intervals; sometimes once or twice in the day, and occasionally not for several days. They are attended by the utmost agony and distress. The actions of the heart are somewhat accelerated during the fit, and sometimes more or less irregular or turbulent; but they are also in other instances nearly natural. There is no morbid sound, beyond a slight bellows-sound in a few cases, heard on auscultation; and the breathing is tranquil. The paroxysm may take place at any period, and when the patient is perfectly quiet, mentally and physically, and without the occurrence of any cause sufficient to account for the seizure. This affection does not appear to be aggravated, or its

attack to be favoured, by exercise, or by motion or position; but, on the contrary, it seems to be benefited by gentle exercise in the open air. Debility and loss of flesh generally are induced by the excessive suffering; but the appetite is not materially impaired. The powers of digestion are, however, weakened, and the bowels are more or less sluggish. — This complaint is generally of long duration. The shortest period in my cases was six or seven months; and in one, where the intervals between the attacks were very considerable, it was as many years.

56. B. *Causes.* — Of the six cases above referred to, two were females. They were both unmarried; but the catamenia were perfectly regular; and neither of them had ever complained of any hysterical symptom, or had experienced pain in the spine. Of the four males, the two most advanced in life had formerly had gout; and in one of them, who was under the care of Dr. ROOFS and myself, the cardiac neuralgia was induced by grief. The other two were medical practitioners: one of them had been engaged in a laborious practice in the country; the other had experienced family contrarieties and disappointments, and was endowed with the utmost susceptibility and irritability. — The recurrence of the attack seems to be favoured by cold, especially by cold east winds; and there is reason to believe that malaria is concerned in causing it. In a violent case, recorded by M. ANDRAL, no trace of organic lesion was observed on dissection.

57. C. *Treatment.* — The means of cure in this affection are not materially different from those advised for ANGINA PECTORIS, to which it is an intimately allied affection. As in that complaint, so in this, and in PALPITATIONS (§ 50.), the indications are — 1st. *To shorten the attack*; — 2d. *To prevent the recurrence of it.* — a. The remedies I have found most efficacious in fulfilling the first intention, are — *camphor* in large doses with *opium*, or acetate of morphia; the *prussic acid*, with *camphor*, or *ammonia*, or other stimulating antispasmodics, or warm carminatives and tonics; a full dose of *calomel*, with *camphor*, *capsicum*, and *opium*, or the muriate of morphia; the preparations of *colchicum* conjoined with *ammonia*, *camphor*, the subcarbonate of soda, &c.; a *mustard poultice* applied as hot as it can be endured over the epigastric region; and a plaster, consisting chiefly of extract of *belladonna* and *camphor*, placed over the præcordia. I have tried various narcotics, besides these just named; but less certain advantage has been derived from them than from those. The extract or tincture of *aconitum*, or of *stramonium*; or the powdered root or leaves, or the extract, of *belladonna*; are, however, often of service, especially when the medicines just mentioned have failed.

58. b. The second intention has been best answered by purgatives, by mild and chiefly farinaceous food, by abstinence from stimulating liquors, by tonics conjoined with absorbents and stimulants, and by external drains or derivatives long persisted in. The carbonate of iron, in large doses, the bowels being kept freely open, has been sometimes of service. — Dr. ELLIOTSON found benefit from it in one instance; but it has failed in other cases; and equal advantage has been derived from a combination of *sulphate of quinine*, *camphor*, and as much puri-

fied extract of *aloes* as acted freely on the bowels. In one of the female cases alluded to, the *nitrate of silver*, given with a narcotic extract, was extremely serviceable. In the other, pills, containing as much *croton oil* as procured at least three or four stools daily, were regularly continued for a considerable time, and a *large issue* was kept long discharging. Complete recovery took place in both instances. In one case, change of air, travelling, attention to diet, and *issues* in the side, effected a cure, the patient being a physician of great learning and extensive medical knowledge. In another case, the symptoms were aggravated by depressants and abstinence; and recovery took place during a recourse to *tonics* conjoined with *anodynes*; to a generous and light diet—the patient being allowed from four to six glasses of old wine, or even more, daily; and to change of air, and the amusements and distractions of watering-places. In one instance, great benefit appeared to follow the persevering use of *croton oil* as an external derivative; an eruption over the epigastrium having been kept long out by its means. In the case of a medical practitioner from Devonshire, who very recently consulted me, all these, as well as other means, altogether failed. At last, an ointment containing *aconitine* was directed to be rubbed over the sternum; but of the effect of this I am yet ignorant. In another instance, no benefit followed the application of an ointment containing *veratria*.

59. Besides the substances already mentioned, I have tried many others. — *Digitalis* has been of no service. Some benefit, however, has followed the internal use of *turpentine* given in drachm doses until it affected the urinary organs; and from the *hydriodate of potash*, or *hydriodate of iron*, conjoined with narcotics. — I tried *créosote* in one case without any advantage. I think that the disease may wear itself out, in some instances, without being much relieved by medicine, if attention be paid to diet and regimen, and to the state of the stomach and bowels, and if the energies of life be supported or promoted by suitable means. — At present, I am attending a gentleman who has been for many years afflicted with this complaint, the paroxysms of which, however, come on after considerable intervals. He was formerly subject to gout, which I have attempted to excite in the lower extremities without avail. He has consulted many physicians in London and on the Continent, and has even given homœopathy a lengthened trial. On no occasion had he experienced any material relief. I was requested to see him six or seven years ago; and have since continued to prescribe for him occasionally, excepting whilst he had recourse to means prescribed by Dr. TURNBULL, from which he derived no benefit. The attacks are shortened and relieved by the medicines mentioned above (§ 57.); but they still recur, although not so frequently as before; attention to diet, an open state of the bowels, and gentle exercise in the open air, being found most efficacious in deferring their visitations.

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IV. INFLAMMATIONS OF THE HEART AND PERICARDIUM. — SYN. *Carditis*, Auct.; *C. Spontanea*, Sauvages; *Cauma Carditis*, Young; *Empresma Carditis*, Good.

CLASSIF. — 1. *Class*, Febrile Diseases; 2. *Order*, Inflammations (*Cullen*). 3. *Class*, Diseases of the Sanguineous Function; 2. *Order*, Inflammations (*Good*). III. CLASS, I. ORDER (*Author*, in *Preface*).

60. DEFIN. — *Continued pain or anxiety in the region of the heart, palpitations, a tendency to syncope or faintness, dyspnœa, acceleration and irregularity of the pulse, with symptomatic inflammatory fever.*

61. Inflammations of the heart were first described by RONDELET, and afterwards by SALIUS DIVERSUS and FORESTUS. More recently, they have received attention from many systematic writers; but, until the appearance of the works of BURNS, CORVISART, KREYSIG, TESTA, HILDENBRAND, and LAENNEC, their pathology and treatment were deficient in precision and accuracy. J. P. FRANK first directed attention to inflammation of the *endocardium*, or internal membrane of the heart, especially in connection with inflammation of the internal surface of the bloodvessels. — HILDENBRAND considered that inflammation might affect either the *pericardium* reflected over the heart, or the *substance of the organ*, or the *membrane covering the valves and internal surface* of the compartments; but that it was seldom confined to any one of these situations. — Of still more recent writers, some have entirely overlooked inflammation of the internal membrane, whilst others have very properly insisted upon its frequency and importance, in its various grades, and in respect of its diversified results. It is somewhat surprising that LAENNEC and HOPE should have neglected this form of carditis, after attention had been directed to it by FRANK, HILDENBRAND, and KREYSIG, M. BOUILLAUD has considered it much more fully than any former writer; but he is mistaken in thinking that he is the earliest writer upon it; for, in addition to the names just mentioned, BERTIN, BARBIER, LITTRÉ, P. M. LATHAM, ELLIOTSON, and WATSON, wrote upon it before the appearance of his excellent work. HILDENBRAND expressly refers the lesions of the internal surface of the organ, and of the valves, to inflammation; these lesions having a more or less strict reference to the intensity and duration of the inflammatory action. (*Institutiones*, t. iii. p. 263.) Since 1824, I have described *internal carditis* in my lectures, and have pointed out the alterations of structure induced by it; and, in treating of inflammations and organic changes of the heart, I have always described it first, considering it as one of the most frequent forms of carditis, and, in its various grades, as the cause of most of the alterations observed in the structure of the organ. On the present occasion, I shall consider, *firstly*, *internal carditis*, or *endocarditis*; *secondly*, *external carditis*, or *pericarditis*; and, *thirdly*, *carditis proper*, or *muscular carditis*, with the lesions which are more immediately induced by them, individually and conjointly. Although it is necessary thus separately to discuss these diseases,

inasmuch as each may exist in a primary and distinct form; yet, as this is comparatively rare, I shall also consider their associations with each other, and with other maladies.

i. INFLAMMATION OF THE ENDOCARDIUM. — SYN. *Carditis Interna*, Author; *Endocarditis*, Barbier, Littré, Bouillaud; *Inflammatio Superficiei internæ Cordis*, Hildenbrand; *Internal Carditis*, *Inflam. of the Internal Membrane of the Heart*.

62. CHARACT. — *Oppression and anxiety at the Præcordia, with frequent faintnesses; dyspnœa; increased action, remarkable acceleration, and irregularity of the heart; and morbid sounds heard on auscultation; the pulse being weak, small, irregular, or indistinct.*

63. A. History. — The serous membrane lining the cavities and valves of the heart is occasionally found intensely red in one or both sides of the organ. This change has even extended to the aorta and pulmonary artery. — Since it was first noticed by J. P. FRANK, it has attracted much attention. The redness cannot be removed by washing, and hardly even by maceration. It has been ascribed to the imbibition of the colouring matter of the blood; but frequently no blood is found in contact with the coloured part. It evidently does not arise from congestion of the cavities of the heart previously to death, because it has been observed where no such occurrence has taken place further than is always attendant upon dissolution. It certainly is not owing to decomposition, either incipient or advanced, as no signs of this change have been detected in connection with it. That it is essentially dependent upon inflammation, is shown by its being very often attended — 1st, by slight thickening and softening of the membrane itself; 2d, by that change in the connecting cellular tissue which permits this membrane to be more readily detached from the adjoining textures than in health; and, 3d, by the presence of the usual products of inflammation affecting serous surfaces. The circumstance of these products being frequently not found on the reddened or injected internal surface of this organ, is readily explained by the fact, that the lymph, the usual product of inflammation of serous membranes, being effused in a fluid state, is commonly carried away by the current of the circulation before it can coagulate on the inflamed surface. — Besides, *internal carditis* very often takes place in connection with that state of constitutional power which JOHN HUNTER very ably proved to be incapable of forming coagulable lymph. But this disease is not infrequently met with in a form which does not admit of doubt; and to that, more especially, I have now to direct attention; its more disputed states also coming under consideration in the sequel.

64. KREYSIG (*Ueber die Krankh. des Herzens*, 2d th. p. 125.) was the first to give a detailed description of *internal carditis*; but M. BOUILLAUD has very recently entered upon the subject much more fully than any of his predecessors. The frequency of the disease, especially in connection with articular rheumatism, will enable the practitioner to investigate its nature, and the phenomena it occasions in relation to the structural lesions which have been produced. This has been ably done by M. BOUILLAUD, who, although he is not the first, is certainly the best,

writer on the subject. — Since 1820, my attention has been directed to internal carditis, in consequence of having then met with a remarkable case of it. (See *Lond. Med. Repos.* vol. xv. p. 26. 1821.) In 1821, I was requested to see another case, which terminated fatally much more rapidly than the former. To both these I was called in consultation with other practitioners; and in both, as well as in a third that occurred the following year, *post mortem* examinations were made. I have since frequently observed this form of carditis; and my experience warrants the assertion, that a large proportion of the more obscure — or what were formerly considered the more obscure — affections of children, particularly those occurring in connection with affections of the joints, are either internal carditis, or this complaint associated with pericarditis.

65. a. *The alterations of the internal membrane of the heart, caused by inflammation of it, vary with the intensity and duration of the morbid action.* — (a) *At an early stage* — 1. *Redness* is one of the most common appearances. It varies from a scarlet tint to a reddish brown or violet hue; and may be limited to the valves, or extended to all the cavities, or even to the large vessels. The inflammatory nature of this redness has been disputed; but when it is attended by one or more of the following lesions, its nature then admits of no doubt. — 2. *Thickening* of the internal membrane, or endocardium, is a common attendant on inflammatory redness, when it has continued a few days, especially of that part reflected over the valves. — 3. *Softening* also sometimes is observed in this stage, but most frequently in the next; this change generally extending to the connecting cellular tissue. — 4. *Ulceration* is met with only in rare cases at this period; but instances of its occurrence are recorded by BOUILLAUD and others. — 5. *A puriform or albuminous exudation* also takes place; but rarely in such a manner as will admit of its demonstration. So great is the force and rapidity of the current of blood through the compartments of the heart, and so rapid the motions of their parietes, that the products of inflammation of their internal surface are swept away and mixed in the circulating mass. Nevertheless, portions of these secretions are occasionally found after acute endocarditis. Puriform matter has sometimes been seen inclosed in a coagulum, or concealed in the meshes of the muscular columns. Coagulated or albuminous lymph has been found in similar situations; but more frequently adherent to the valves, or to their margins, or tendons. Occasionally it appears like granulations on these parts. — 6. *Gangrene* has been supposed hardly ever to occur from carditis; but M. BOUILLAUD considers that the appearances observed in some of his cases warrant the inference that it may take place, although rarely in consequence of acute endocarditis; and I believe that it will supervene only when internal carditis attacks a cachectic habit of body, or when there is a septic tendency induced in the system by a depraved state of the circulating fluids and by impaired vital power. — 7. *The blood* is more or less affected by acute endocarditis. When the disease attacks a person whose blood has not been already materially vitiated, or whose

soft solids have not been materially affected, then it occasions a greater or less disposition of this fluid to coagulate, and gives rise to fibrinous concretions resembling those found in the bloodvessels after inflammations of their internal surfaces. These concretions, when formed in the heart, are colourless, elastic, glutinous, and adherent to the internal surfaces of the cavities, or interlaced between the fleshy columns and tendons of the valves, and resemble the buffy coat of the blood. They are manifestly produced by the lymph exuded by the inflamed internal surface of the organ, which, towards the close of life, forms the nucleus around which the fibrinous portions of the blood collect and concrete.—If, however, internal carditis occurs when the blood is already vitiated, and vital power is either much impaired or deteriorated, the fluid effused from the inflamed part will be incapable of coagulating itself, or of causing the coagulation of the blood—will be of a watery or sanious kind—and will instantly mix with the mass of blood, and further vitiate it; death soon taking place, with all the symptoms of adynamic or putro-adynamic fever.

66. *b.* The *second stage*, or the period intervening between the fifteenth and thirtieth day of the disease, is attended by other alterations.—1. The inflamed membrane is more *thickened*, this change often extending to the connecting cellular tissue, and even to the fibrous textures, especially of the valves.—2. The albuminous or fibrous exudations now pass from the amorphous to the organised state, and assume the appearances of *excrecences, vegetations, granulations, cellulo-fibrinous adhesions*, and of *sero-albuminous false membranes*. M. BOUILLAUD observes that the excrecences or granulations are most frequent on the valves, especially their free edges. He divides them into the *globular* or albuminous, and the *warty*. The former are soft, of a whitish, yellowish, or reddish hue, and easily detached; and originate in the organisation of adherent coagulable lymph, as observed to take place on the surface of other serous membranes. The warty excrecences are of a cartilaginous consistency and firmly attached. They are either distinct, or aggregated into groups presenting a cauliflower appearance; and vary in size from that of a millet-seed to that of a pea. Both these kinds of vegetations seldom exist alone, either on the valves or on the internal surface of the cavities; but are commonly attended by fibro-cartilaginous or calcareous induration of the valves; and when they are large, numerous, or aggregated, they necessarily occasion narrowing of the orifices, and an impediment to the action of the valves.—3. *Adhesions* of the opposed surfaces of the internal membrane were first described by M. BOUILLAUD, who has adduced six cases in which he met with them. They are, however, rarely observed; for the force of the blood's circulation, and the movement of the parietes of the cavities and of the valves, prevent their formation, excepting at those places where these obstacles are the least, as between the less moveable parts of the valves, and the opposite surfaces of the ventricles. These adhesions disturb the regularity of the circulation, by preventing the valves from completely closing the orifices. Another species of adhesion is sometimes ob-

served between the opposite margins of the valves in certain cases of narrowing of the orifices, which will be mentioned hereafter.—4. *Organised false membranes* are also occasionally found covering a greater or less extent of the internal surface of the heart; and M. BOUILLAUD states, that he has seen these membranes consist of several superimposed layers. In place of these, small colourless patches, of from four to six lines in diameter, sometimes form on the endocardium, and may be removed, leaving it more opaque than natural.—In many cases, the supposed thickening of this tissue has been entirely owing to organised false membranes; but as often the endocardium is itself thickened, opaque, and its free surface unequal, somewhat wrinkled, and villous; this change extending, as stated above, to the connecting cellular tissue.

67. *c.* In the *third or chronic stage* of internal carditis, the cellulo-fibrous, the fibrous or fibro-cartilaginous, alterations or formations observed in the former stage are converted into the *cartilaginous, osseous, or calcareous state*.—1. These latter productions sometimes consist of circumscribed points—occasionally of thin patches of the size of the finger-nail or even larger—or more rarely of rounded masses.—The valves may be almost entirely changed into a cartilaginous or osseous structure; but the fibrous zone of the orifices, and the points of the valves, most frequently undergo this alteration. Between these morbid patches or incrustations, the spaces are either natural or simply thickened.—The *osseous formations* often reach a very considerable size and assume very irregular shapes, and sometime even penetrate deeply into the substance of the heart.—2. The cartilaginous or osseous valves are variously altered. As long as these changes consist of simple points or laminæ of small extent, the thickened and more rigid valves may still perform their offices; but when these alterations become more extensive and complete, the valves can no longer fulfil their functions. In this stage they present various lesions, as to form. Sometimes, as shown by LAENNEC, BERTIN, and others, their margins, especially those of the aortic valves, are folded *in*, so as to give an *inverted* appearance; and occasionally they are folded back, forming what has been described by Dr. HODGKIN and others under the name of *retroversion*. They may also be too short, or too unyielding, or too small, to close their respective orifices; and the orifices, on the other hand, may be too large for the valves. In either case, these latter will be *insufficient* for their purposes.—The diseased valves are occasionally perforated, or torn or ruptured in different directions; and those of the aorta have been found so completely torn as to be nearly detached. Sometimes one set of valves only is affected; but more frequently, when one set is very severely altered, another is opaque, thickened, or otherwise changed in some degree.—3. *Contraction* of the heart's orifices is amongst the most common and most serious consequences of the changes now being considered. It may be so extreme as not to admit the point of the little finger, or even a quill. The thickened and hardened valves sometimes adhere at their opposite margins, leaving a permanent opening of a roundish, oval, crescent, or slitlike form; which, in the case of the auriculo-

ventricular valve; resembles the glottis or the os tinæ, owing to the thickening of the margins, and projection into the cavity of the ventricle. The thickening and induration occasionally extend to the tendons or even to the muscular columns. The semilunar valves also often stand firm and convex, or rigid. These changes have been well described by Mr. ADAMS and M. BOUILLAUD. — Dr. ELLIOTSON remarks that the valves of the pulmonary artery sometimes grow up so as to leave only a small round or triangular opening in their middle.

68. *d.* The inflammatory origin of the changes now described has been doubted by several pathologists, and even by LAENNEC; but it has been advocated by FRANK, KREYSIG, HILDENBRAND, ANDRAL, ELLIOTSON, BOUILLAUD, LATHAM, WATSON, and others. Osseous formations in the heart have been supposed to occur only in advanced age. BOUILLAUD states, that of 44 cases, 33 occurred in persons under fifty, and 19 out of these were observed in persons under thirty; one being only ten years, another seven, and a third ten months. I have met with this formation in two children, — one of seven, the other of ten years; and in both, the symptoms, and associated lesions observed on dissection, were obviously inflammatory. Indeed, the matter is put beyond dispute. — The narrowing of the orifices of the heart by chronic inflammation is, as remarked by a recent writer, very analogous to what takes place in other organs from this cause — as in the urethra, and lachrymal and biliary ducts, the pylorus, the rectum, &c.; and the hypertrophy of the heart which succeeds, may be compared to the thickening of the muscular coats of the bladder, stomach, and other hollow viscera, arising in such circumstances from the difficulty of expelling their contents owing to the obstruction. When inflammation attacks the internal surface of the heart, the parts of it about the boundaries of the cavities, and near the orifices, or covering them and the valves, are most liable to be affected, as commonly observed about the boundaries of other cavities and canals. — BICHAT had noticed the greater frequency of the lesions just mentioned in the left, than in the right, side of the heart. The fact is undoubted. M. BERTIN considered that inflammation and its consequences are more likely to be occasioned and maintained by the exciting properties of arterial blood, than by the inert venous blood returned to the right side of the heart. This, however, is not sufficient to explain the circumstance; for inflammations are more frequent in veins, than in arteries.

69. *B. Symptoms of Internal Carditis.* — *a.* In the first or acute stage, actual pain is seldom felt, unless the disease be associated with pericarditis or with pleuritis; but uneasiness, oppression, or anxiety, in the præcordia, with faintness, is always complained of. The physical signs require the closest attention. — 1. The præcordial region, in simple endocarditis, is shaken by the violence of the heart's action, the hand being forcibly resisted by the impulse when applied over this region. The pulsations are felt over a greater extent than natural, owing to the turbulence of the organ in an inflamed state; and a vibratory tremor, more or less marked, is also sometimes left. — 2. Percussion furnishes a dull

sound over a greater extent of surface than natural; from four to nine or twelve square inches. But, in order to distinguish this sound from that attending effusion into the pericardium, it is necessary to observe, that it coexists with a superficial, visible, and sensible pulsation of the heart; the beat being profound, and hardly visible or sensible in cases of pericarditis with effusion. — 3. Auscultation detects a bellows sound, which masks the two normal sounds, or one of them only. This sound is the louder, the stronger the action of the heart; and is also rougher, the greater the swelling of the valves, and the more abundant or concrete the exudation of lymph from the inflamed surface. Sometimes, when the palpitations are violent, a metallic sound isochronous with the systole of the ventricle is also heard. — 4. The force of the heart's contractions is changed both to the eye and to the touch, and the frequency equally affected, the pulse rising sometimes as high as 140 and 160, or even higher, in a minute, and becoming irregular, unequal, or intermittent. — 5. Animal heat is generally also increased, but not usually in proportion to the augmentation of the circulation. The arterial pulsations represent only the frequency, but not the strength, of the heart's action in this disease; for, whilst the contractions of the heart are energetic, the pulse is generally small, soft, and indistinct. This is owing to the obstacle opposed to the circulation by the swelling of the valves or orifices, or both; or by the fibrinous exudations formed around them; a smaller column of blood being thrown into the arterial trunks; hence, probably, arise the pallor, anxiety, jactitation, faintness, leipothymia, want of consciousness, &c., frequently also observed.

70. In general, the venous circulation is not materially disturbed in this stage of internal carditis; but when the above obstacles to the circulation through the orifices become considerable, dyspnoea, a bloated or livid appearance of the face, slight œdema of the extremities, and pulmonary or even cerebral congestion often supervene. In this case, the patient experiences the most distressing oppression, cannot lie down in bed, is watchful, restless, and subject to a constant jactitation. In the simple form of endocarditis, delirium seldom occurs; but temporary wandering of the mind, and sudden terror, or unconsciousness, are occasionally present when the dyspnoea is extreme. — The digestive functions, the secretions and excretions, are also more or less impaired; and in the more extreme states, cold sweats often break out.

71. The above symptoms appertain especially to the acute form of endocarditis, particularly when it is general. But when it is partial, or sub-acute, or chronic, the symptoms are not so prominently grouped; and it is, consequently, recognised with greater difficulty. An attentive observer, however, will seldom mistake it for any other disease, excepting pericarditis, with which it is very liable to be confounded, even by the most experienced. But the error is not material; for both diseases very often coexist, and the means of cure are the same in each. When pericarditis is attended by effusion, then it is readily distinguished from endocarditis by the circumstance mentioned above (§ 69.); but, when it gives rise merely to a pseudo-membranous exudation, a

diagnosis is formed between them with very great difficulty; the sounds, however, in this state of pericarditis, will be a tolerable guide to a correct inference.

72. *b. The symptoms of the second and third, or chronic, stages of internal carditis* have reference chiefly to the *structural changes* that have been induced. The disease may have terminated in resolution before advancing into these stages, the foregoing symptoms having disappeared. But, when it has been mistaken, or neglected, or imperfectly treated, it passes into these sub-acute and chronic states or stages; the inflammatory action gradually subsiding as to intensity, or passing into that slow or chronic form observed to produce similar changes in serous tissues to those which have been described (§ 66, 57.).—Of all the organic lesions consequent upon endocarditis, the different forms of *induration of the valves and contraction of the heart's orifices* are the most permanent; often continuing after the inflammatory action which produced them has disappeared, whether this action has been *acute, sub-acute, or chronic*.

73. *c. The symptoms of induration of the valves and narrowing of the orifices* are generally such as lead to the detection of these changes, as well as of the consecutive hypertrophy and dilatation.—1. *Inspection* shows merely the extent, force, and rhythm of the pulsations.—2. The *hand applied on the præcordial region* discovers a vibratory, or purring tremor, with irregularity, inequality, or intermissions of the heart's action; or a treble or quadruple movement, as well as the increased force and extent of the contractions.—3. *Percussion* furnishes a dull sound to a greater extent than in health.—4. *Auscultation* detects, during the contractions of the heart, a morbid sound, which is *blowing, filing, grating, rasping, or sawing*, as to its character, according to the resistance furnished by the diseased valves, to the degree of contraction of the orifices, to the capacity of the cavities, and to the strength of their parietes.—Each of these sounds may be either *double or single*: the former completely masking or replacing both the natural sounds; the latter, only one of them. The morbid sound varies in duration and intensity: it is sometimes sudden, short, abrupt, and jerk-like; in others, it is slow, prolonged, or drawn out. It is occasionally so loud as to be heard even at a short distance from the chest; and, in some cases, it is so slight as to be detected with difficulty. In a few instances of induration of the valves, the bellows sound assumes a sibilous character.—5. *Pain* seldom attends the above lesion; but the patient complains of weight, or of uneasiness or embarrassment, at the præcordia; of palpitations, of sinking, or of faintness. The palpitations are excited by the least exertion or mental emotion; and are characterised by the increased force, and the remarkable frequency, of the pulsations, which may reach 160 beats or upwards in the minute.

74. When, therefore, either of the morbid sounds just mentioned is present at the præcordial region, with a vibratory or purring tremor, palpitations, an irregular, tumultuous, or intermittent action of the heart, it is in the highest degree probable, that induration of the valves, and narrowing of one or more of the orifices, exist—particularly if the disease is of some months' or years' duration.

This inference amounts to certainty, when, with the above *local signs*, the following *general* or sympathetic phenomena are present, especially a small, weak, or vibratory pulse, which contrasts remarkably with the energetic actions of the heart; dilatation of the superficial veins, particularly of those near the heart, as the jugulars, &c.; sallowness or lividity of the countenance; symptoms of congestion of the lungs, brain, liver, and mucous surfaces; passive hæmorrhages from the lungs and mucous membranes; dyspnœa, shortness of breath, or sense of oppression or stuffing in the chest, increased on slight exertion; effusions of fluid into serous cavities, or into cellular parts, &c.; and cerebral derangement, as restlessness, watchfulness, frightful dreams, jactitation, laborious breathing, &c. Pulsations of the jugular veins, synchronous with the pulse, are observed when a reflux of a portion of the blood takes place from the right auricle, during the contraction of the right ventricle, owing to insufficiency of the tricuspid valve, either from alterations in itself, or from dilatation of the auriculo-ventricular orifice.

75. *d. The diagnostic symptoms of lesions of the different valves, and of narrowing of the different orifices of the heart*, have been stated with more confidence than truth, by some who have made the stethoscope an instrument of parade and charlatanry. In answer to the question—Can this diagnosis be established? M. BOUILLAUD justly answers, that it is more curious than useful.—There is no doubt of the morbid sound being loudest at a point the nearest to the diseased orifice; and upon this, much of the diagnostic evidence rests. But further proof is requisite. When the *pulse* is examined in connection with the action of the heart, it is generally more irregular, unequal, intermittent, and smaller, in narrowing of the *aortic orifice*, than in that of the *left auriculo-ventricular orifice*; and the vibratory tremor of the pulse in the large arteries, first noticed by CORVISART, is most remarkable in the former case. The maximum also of the intensity of the purring tremor in the præcordial region, as well as the maximum intensity of the morbid sound, corresponds with the contracted orifice.—M. BOUILLAUD considers that synchronism of the morbid sound with the ventricular systole or diastole, signifies nothing; but in this he is incorrect; his opinion being the consequence of his views respecting the source of the natural sounds of the heart.—Narrowing of the *orifices of the right side* is infinitely less frequent than that of the left orifices; and is indicated by the correspondence of the maximum of the morbid sound and of the purring tremor with the situation of these orifices, and by the distension and pulsation of the large veins, especially of the jugulars.

76. Dr. WILLIAMS has divided structural lesions of the valves and orifices of the heart into two kinds—the *obstructive* and *regurgitant*; according as they *impede* the current of blood in its proper direction, or permit its *reflux*. But some alterations are both obstructive and regurgitant, as they impair both the opening and the closing of the valves.—*a. Obstruction at the aortic orifice* is attended by a bellows sound, which is superficial, and occasionally sibilous, about the middle or top of the sternum, or about the cartilages of the fifth and sixth left ribs, and

which masks or replaces the *first* natural sound, and occasionally extends to the carotids. The *second* natural sound is either weak or indistinct, when the aortic valves are much diseased, the pulse being remarkably small and weak.—Obstruction of this orifice generally causes enlargement of the heart.—When lesions of the aortic valves render them *insufficient*, and occasion a *reflux* current into the ventricle, a short whiffing sound replaces the *second* natural sound at the middle of the sternum; the second natural sound in the pulmonary valves still remaining audible to the right of the sternum. Insufficiency of the aortic valves gives rise to dilatation, with hypertrophy of the left ventricle.

77. *b. Obstruction at the left auriculo-ventricular orifice*, or obstructive disease of the *mitral valve*, may be attended by a morbid sound or murmur at the time of the second natural sound, owing to the resistance to the current during the refilling of the ventricle; the morbid sound, however, not replacing the second normal sound, as the action of the semilunar valves may still be perfect, but merely attending it, or masking it, when loud. This lesion is accompanied by a small, but strong or hard pulse. It usually occasions hypertrophy of the left ventricle, sometimes with diminution of its cavity, and dilatation of the left auricle.—*Insufficiency* of the mitral valves produces a morbid sound at the time of the first natural sound, that is most distinct at the left margin of the sternum, between the third or fourth ribs, or rather more to the left, or as far as the left nipple, or a little below it; and that does not extend to the arteries. The pulse is always irregular or intermittent.—This lesion commonly gives rise to hypertrophy of the left ventricle, with dilatation of the auricle.

78. *c. Lesions of the semilunar pulmonary valves* are very rarely observed. Obstruction in this situation occasions a morbid sound at the middle of the sternum, more superficial and whizzing than that caused by disease of the aortic valves (HOPE). The circumstances of the morbid sound being inaudible over the great arteries, as Dr. WILLIAMS observes, of its not affecting the pulse, and of its causing more marked signs of venous congestion and disease of the right side of the heart, are more to be depended upon, than the mere situation of the morbid sound, in the diagnosis of this alteration.

79. *d. Lesions of the tricuspid valve, and of the right auriculo-ventricular orifice*, are more common than those of the pulmonary valves; but less so than those of the mitral valve. They give rise to a deep blowing or filing sound, most distinct under the sternum at the juncture of the fourth rib. If the lesion *obstruct* the current of blood, the morbid sound will replace the *second* natural sound; but if it allow *regurgitation* into the auricle, the morbid sound will accompany the *first* sound; the regurgitation giving rise to pulsation in the jugular veins, and to dilatation of the right auricle, or ventricle, or of both.

80. *e. Adhesion of the auriculo-ventricular valves to the parietes of the heart*, according to M. BOUILLAUD, are attended by the symptoms of narrowing or contraction of the orifices, especially palpitations, the bellows sound, the purring tremor, dyspnœa, and venous congestions, with

passive effusions; but are distinguished—1st, by the more broad, less dry, and less rasping sound, than in narrowing;—2d, by the less irregular, less unequal, and less intermittent pulsations of the heart; the purring tremor being more diffused, and less distinct, than in narrowing of the orifices;—3d, by the pulse being less small, and the oppression at the præcordia, the venous congestions, and their consequences, being less remarkable than in the latter lesion.

81. *f. The diagnosis of thickening of the internal membrane of the heart*, whether this change depends upon a true hypertrophy of this tissue, or upon the organisation of a false membrane lining its surface, is frequently impossible. When the thickening extends to the valves, without any other lesion of them or of the orifices, a remarkable increase in the loudness of the sounds is produced—especially if the mitral valve is affected. When the valves, or the orifices, or the parietes of the compartments, are otherwise altered, as they most frequently are, contemporaneously with this change, the signs will have a particular reference to such alterations.

82. It is justly remarked, by Dr. WILLIAMS, that, when two or more of the preceding lesions are associated, the signs become complicated, and the obscurity of the case increased; for, unless the character and locality of the morbid sound be distinct, the more prominent may mask the others. When the sounds are different, one being filing or grating, and the other blowing, the difficulty is less, and the nature and position of each affection may be exactly indicated. Rasping, or sawing, sounds are very rarely produced by mere contractions, or by soft depositions, unless for a short time during increased action of the heart. When these sounds are permanent, they may be referred to cartilaginous or osseous deposits in or about some of the valves. Hypertrophy and dilatation often make the signs of diseased valves more evident, by augmenting the force of the current through the cavities, and rendering more distinct the place and order of the sounds.

ii. INFLAMMATION OF THE PERICARDIUM.—*SYN. Carditis externa*, Author; *Pericarditis*, Auct. var.; *Carditis*, Sauvages, Vogel, &c.; *Inflammatio Cordis et Pericardii*, Senac; *Hertzbeutelentzündung*, Germ.; *Péricardite*, Fr.; *Inflamazione del Pericardio*, Ital.; *External Carditis*, *Inflammation of the Envelope of the Heart*.

83. *CHARACT.*—*Pain under the sternum, inclining to the left side and to the epigastrium, with tenderness on firm pressure in the latter situations; dyspnœa; anxiety, oppression, constriction, or tightness at the præcordia; great rapidity and irregularity of the heart's action, and of the pulse; inflammatory fever; and morbid sounds detected by percussion and auscultation.*

84. *A. History, &c.*—*Pericarditis* was first mentioned by AVENZOAR, who was himself attacked by it, and was cured by bloodletting; but, excepting the cursory notice taken of it by RONDELET, SALIUS DIVERSUS, and FORESTUS, little attention was directed to it, until BONET, HILDANUS, BERGER, MORGAGNI, and others, recorded cases illustrative of its morbid relations. Still more recently, our knowledge of its nature

and treatment has been much advanced, by the writings of CORVISART, BURNS, KREYSIG, LAENNEC, TESTA, BERTIN, ELLIOTSON, STOKES, and others; and by numerous memoirs, which have appeared in the transactions of medical societies, and in periodical works, and to many of which references are subjoined.

85. *B. Structural Lesions.*—*a. In the acute stage of pericarditis*—*a.* The earliest change is *redness* of the pericardium, from capillary injection. In some cases, particularly when death has taken place rapidly, the redness is not remarkable, probably owing to the recession of the blood from the capillaries after death. The increased vascularity is principally seated in the subjacent or connecting cellular tissue; and the redness is sometimes increased by the infiltration of minute quantities of blood into this tissue, or into the serous membrane itself, so as to give rise to ecchymoses, or red points, spots or patches, or streaks. The thickness, transparency, and consistence of the pericardium, seldom undergo great changes at an early period of the disease; yet this membrane is often thicker and more opaque, than in the healthy state. It is generally detached with greater ease from the surface of the heart, and its removal shows the injection and redness, or infiltration of the connecting cellular tissue.—The natural exhalation from the surface of the pericardium is either increased in quantity, or remarkably altered in kind, or both; the *accumulated effusion*, which thus results, constituting a principal part of the changes produced by the disease.

86. *β.* The *effusion* into the pericardium presents various states, and undergoes changes of much importance as respects the subsequent course of the disease.—1st. The effused fluid usually coagulates, or separates, into a turbid or flocculent serum and a concrete or fibrinous false membrane, which is organisable, and commonly covers the free surface of the cardiac envelope. In some instances, the coagulation is more irregular, or presents a curdled appearance, without being disposed in a membranous form over the external surface of the organ. The more fluid part of the effusion is generally serous, but it is sometimes sanguineous or tinged by the escape of a portion of the colouring substance of the blood. Occasionally the effused matter consists chiefly of coagulable lymph disposed in the form of false membrane; but more frequently the membranous depositions are accompanied by a quantity of fluid varying from a few ounces to several pounds. M. LOUIS adduces a case in which it amounted to four pounds; and CORVISART another, in which the pericardium contained a still larger quantity of a sero-puriform fluid.—2d. In some cases of pericarditis, the effused matter consists of a homogeneous, inodorous, and *well-digested pus*, of the consistence of cream, and of a greyish, yellowish, or greenish white hue. The quantity of this matter varies as much as that of the former, or sero-pseudo-membranous effusion.—Cases of pericarditis giving rise to a purulent effusion have been recorded by P. FRANK, HASENOEHL, MONRO, STOERCK, STOLL, LIEUTAUD, SENAC, BAILLIE, CORVISART, LOUIS, BOUILLAUD, and several recent writers.—Instances in which the fluid presents a *sero-puriform* character are frequent.

87. *γ.* The *coagulated* or *fibrinous lymph* formed in acute pericarditis is sometimes found in amorphous masses; but it is most frequently disposed in a membranous form, covering the greater part, or even the whole, of the free surface of the pericardium, especially of that part reflected over the heart. This false membrane varies in thickness from a fraction of a line to several lines. The appearance of the free surface of this membranous exudation is generally peculiar. CORVISART compared it to the internal surface of the second stomach of a calf. Sometimes it resembles the surface of a pine-apple. Dr. HOPE remarks, that, when the layer is thin, its free surface is often pitted with small depressions at regular intervals, presenting the aspect of a fine reticulation; and that, when it is thick, the surface is divided into more spacious cells, often as large as a pea, and separated by coarser partitions. In most of the cases which I have examined, the surface either was shaggy, or hanging in numerous short shreds—the “*Cor hirsutum, villosum, tomentosum*,” of the older writers; or presented an appearance similar to that produced by pressing soft grease between two smooth plates and by forcibly separating them. In some preparations of my colleague Dr. SWEATMAN, these appearances are beautifully preserved, the membranous exudation in these having surrounded the whole of the heart. M. CRUVEILHIER and Dr. HOPE have delineated these changes in their pathological works.—In some instances, the effused lymph is arranged in transverse undulations, or it presents an indented or wrinkled form. It occasionally acquires a deeper hue, the older it becomes; or presents a deep brown or reddish brown colour, most probably derived from the colouring matter of the blood which the effused fluid contained.—The more recent the membranous exudation, the more feeble is its *cohesion*; and the older it becomes, the greater is its tenacity and elasticity.

88. *δ.* The rapidity with which effusion takes place, in consequence of pericarditis, is often remarkable; and the celerity with which organisation commences in the coagulated lymph, is often equally great. This is most evident when the lymph agglutinates the opposing surfaces of the membrane. Many years ago, I demonstrated that, when coagulable lymph is effused on an inflamed serous surface, and is brought in contact with that portion of the surface directly opposite to it, inflammatory action is generally thereby excited in the latter situation, without having extended to it continuously from its former seat. In all such cases, the lymph acts as an irritant to the healthy surface opposite, and sooner or later induces inflammatory action and adhesions of the opposite parts. This always takes place when the pericardium is acutely inflamed, and when the quantity of the fluid effused is not too great to prevent adhesion from taking place.

89. *b. In the chronic stage or state of pericarditis*, the pericardium becomes thickened, or hypertrophied; but this change is most remarkable in the subjacent cellular tissue. The apparent thickening is also sometimes owing to a fine and dense false membrane so firmly adherent to the pericardium as to resemble it on a superficial view. In this state or stage of the disease, the

capillary vessels and larger branches are developed beyond their natural size. Sometimes, in addition to these changes, a quantity of puriform or sero-puriform matter is found in the pericardium; but more frequently a quantity of serum, either limpid, turbid, opaque, flocculent, or sanguineous, is met with.—*a*, The *coagulable lymph* effused in the acute state of the disease, generally undergoes various changes in the course of this stage. In its place there is sometimes only found cellular adhesions, general or partial, or merely simple bands stretching between the opposite surfaces. In other cases, organised false membranes cover a portion, or even the whole, of the surface, and present a whitish, milky, or opaline appearance, particularly when they are limited in extent. In all these cases, more or less fluid, such as just described, is also present. Partial or limited false membranes are seen not only on the surface of the heart, but frequently also on the parts of the large vessels covered by the pericardium, and especially over the root of the aorta. These membranes are usually cellulo-fibrous or fibrous; but, in the more chronic cases, they may assume the cartilaginous or even the osseous state. In a few instances, the heart has appeared as if more or less enveloped in an osseous shell. Sometimes these changes take place in the fibrous structure of the pericardium itself. Occasionally, in place of the morbid productions being disposed in the form of bands or membranes, they assume that of granulations, or excrescences.

90. *β*. The effused fluid and morbid productions in the pericardium are often attended by various changes in the *substance*, or in the *internal surface* and compartments, of the heart, generally resulting from the extension, the pre-existence, or the co-existence, of inflammatory action in these parts, especially in the endocardium. M. BOUILLAUD attributes much of the alteration presented by the substance of the organ in these cases to the compression which the matters in the pericardium exert, and to the consequent embarrassment of the heart's action. This is probably the case; but much is also owing to the consequences of associated inflammation of the internal surface of the organ; for, although this disease may commence in either surface, it seldom runs its course in a simple form, or without extending to the other, or even to other structures. However this may be, it is indisputable, that, in a very large proportion of cases of pericarditis, and especially in those which are chronic, more or less of the changes characterising, or resulting from, *internal carditis* (§ 66, 67.) are also observed, as well as many of those alterations which are yet to be considered.—M. BOUILLAUD has noticed *atrophy* of the heart as one of the changes consequent upon membranous productions and effusions in the pericardium. This change I have also remarked, as well as loss of the colour—an extreme paleness of the heart's substance. This latter change was observed in a case published by me in 1821.—But *hypertrophy*, &c., of one or more of the compartments of the organ is most frequently seen in connection with pericarditis. In some instances, *induration* and thickening of the pericardiac envelope extends from the subjacent cellular tissue to the muscular structure, or rather, perhaps, to the cel-

lular tissue connecting the fibres; and these parts assume, in rare cases, a nearly cartilaginous state.—*Softening* attended by a dark or deep red colour (*brownish red softening*), or by loss of colour (*yellowish white softening*), of the substance of the heart, also is occasionally met with in pericarditis; the former most frequently in the acute state, the latter in the chronic. But these and still more remarkable changes are observed chiefly in cases of pericarditis associated with acute carditis (§ 109.). The coincidence of yellowish white softening of the substance of the organ with pericarditis was noticed by LAENNEC, and has been attributed by BOUILLAUD to the macerating effect of the serum contained in the pericardium. In a case of rheumatic pericarditis, readily recognised during life, this form of softening was observed by me on dissection; but there was scarcely any effusion, and there had been no evidence of much having existed at any period of the disease, although partial false membranes had formed.—In thirty-six cases in which M. LOUIS observed effusion in this disease, the fluid was sero-sanguineous in four, a turbid serum in nine, sero-puriform in fifteen, and purulent in seven.—According to my own observation, a turbid or flocculent serum is most frequently met with; a purulent matter being found chiefly in sub-acute and chronic cases, and independently of any ulceration. (See further, as to *Effusion of Fluid into the Pericardium*, the article, *DROPSY OF THE CAVITIES OF THE CHEST*, § 148. *et seq.*)

91. *γ*. The *external surface* of the pericardium is not always free from very decided marks of inflammatory action.—These marks are, however, found chiefly when pericarditis has been preceded, attended, or followed, by pleuritis, pleuro-pneumonia, or by inflammation of the superior surface of the diaphragm, or of the mediastinum. In cases of this kind, and perhaps also in others of great severity, or where the unattached sac has been principally affected, coagulated lymph is not infrequently found uniting the external surface of the pericardium to the pleura, a turbid serum being more or less abundantly effused into the pleural cavity. Whilst writing this article, I had an opportunity of examining, after death, a remarkable case of this kind; and another, presenting the same appearances, was brought into the dissecting-room of the Middlesex Hospital Medical School, whilst this sheet was about to go to press, the man having died suddenly.

92. *δ*. When pericarditis does not *terminate* in resolution, and in the absorption of whatever lymph has been effused, the next best termination that remains, as Dr. HOPE observes, is adhesion of the opposite surfaces; for, should this not take place, the false membrane becomes a secreting surface, effusing more and more fluid until the cavity is completely distended, and the action of the heart at last abolished. But, should adhesion take place, further effusion is thereby prevented, and life is often prolonged for many months, or even years; although adhesion occasions another form of organic change, which ultimately destroys the patient.—That adhesion occurs in one case and not in another, is entirely owing to the quality of the lymph, which depends upon the state of inflammatory action, and that, in its turn, upon the constitutional powers; for

the disposition to adhesion will be great in proportion to the abundance of coagulable lymph and scantiness of serous fluid effused, — a large quantity of watery, serous, or puriform fluid preventing adhesion from taking place.

93. The *process of adhesion* is very manifest. — When the more watery parts are absorbed, either the lymph on the opposite surfaces of the pericardium come in contact, as when the whole surface is inflamed, or that on the one surface comes in contact with the opposite part, excites inflammatory action in it (§ 88.), and a reciprocal effusion of lymph; both portions blending, thickening or coagulating, and gradually becoming organised. — As organisation commences and proceeds, blood-stains, straggling red lines, or pink-coloured vascularity, appear in the coagulated lymph, which now assumes more and more of a cellular or cellulo-fibrous character, and agglutinates more or less firmly and extensively the opposite parts. The more recent adhesions are generally thick, friable, and separable by tearing into two layers, one adhering to each surface of the pericardium; but those which are of longer standing are thinner and firmer, and consist of fine layers of dense cellular tissue. In some very old cases, this medium of adhesion becomes so thin as to be hardly perceptible, and the union so firm and intimate as not to admit of separation, thereby giving rise to the deception of the pericardium having been wanting.

94. It not infrequently happens, that, after the acute symptoms have been partially subdued, and the disease has continued for some months in a chronic state, false membranes, or adhesions, having been formed, the inflammation either recurs, or assumes a more acute state, and gives rise to an additional deposition of lymph, thereby thickening the adventitious membrane very remarkably. In these cases, the layers are successively redder as they are nearer the heart, and exhibit different degrees of consistence, — one layer or part being almost fluid or purulent, while another is cellular-fibrous, or semi-cartilaginous, or presents the density of tubercular induration. In these, changes in the substance of the heart, or in its internal surface, orifices, or valves, or in both orders of parts, similar to those already alluded to (§ 66, 67.), are generally also observed; and a fatal termination is seldom long deferred.

95. *C. Symptoms and Diagnosis of Pericarditis, and of its Consequences.* — Inflammation of the pericardium was considered by LAENNEC and several recent writers as the most difficult of the diseases of the heart to detect. This arose from too little attention having been paid to the rational symptoms attending it, and from the sounds occasioned by it having been imperfectly ascertained. The difficulty has been much exaggerated; for, of the numerous cases in which I have been consulted since 1818, some of which were published as early as 1821, the disease was detected during life in all but one, which I saw with Dr. DUFFIN. This case was complicated with other lesions, and terminated fatally a few hours afterwards; the constant vomiting and affection of the diaphragm having masked the symptoms indicative of pericarditis. That this disease is often overlooked, or confounded with inflammations of the pleura, lungs, diaphragm, &c., with which it is often complicated, cannot

be doubted; and that it is, in its various grades of intensity and states of association, a much more common malady than has been supposed, is shown by the fact of M. LOUIS having found it in the proportion of one case in twenty in all the dissections he has made. This is still further proved by the circumstance of my having seen as many as four cases of the disease in one day: three of them in children under ten years of age, who were brought to my house, and who were examined also by Mr. H. BARKER, the present house-surgeon to the North London Hospital, and then one of my pupils. On two occasions, I have met with the disease in two children of the same parents, and once in two brothers at the same time. — Although auscultation and percussion furnish some of the most important signs of pericarditis, and of its consequences, yet they must not be depended upon without carefully ascertaining the rational symptoms, local and general, and cautiously comparing and estimating all the phenomena observed.

96. *a. Symptoms of the acute or first stage.*

— (a) The *local signs* of acute pericarditis consist — 1st, of altered *sensibility*; — 2d, of disordered *action*; — 3d, of change in *form*; — 4th, of morbid *sounds* heard on percussion and auscultation. — *a. Pain*, more or less acute, is very frequently complained of under the left nipple, extending to the lower extremity of the sternum, occupying sometimes the whole præcordia, irradiating thence to the left axilla, or arm, or to the diaphragm and epigastrium, or to the left hypochondrium. The pain is pungent, lancinating, tearing or violent; is often attended by a sense of compression and constriction, and by anxiety; and is increased on percussion, on a full respiration, on coughing, on holding the chest erect, and on lying on the left side. In many cases, however, the pain is dull, or so slight as to be little or not at all complained of; but if pressure be made upon the intercostal spaces, or upwards from the epigastrium towards the pericardium, more or less internal pain will be excited. Cases also occasionally occur in which no pain is felt at the præcordia, and, consequently, where the existence of pain on pressure in these situations has been neither inquired after nor ascertained; and instances are not uncommon where the pain of pericarditis is masked by an associated acute pleuritis or severe articular rheumatism. I agree with Dr. ELLIOTSON and Mr. MAYNE in considering pain or tenderness, circumscribed in extent, and confined chiefly to the left side of the epigastrium, and felt most when pressure is directed upwards on the diaphragm and under the anterior margins of the left false ribs, as one of the most constant symptoms of pericarditis. — M. BOUILLAUD observes, that the more simple the disease, the more frequently is it latent, and in this he agrees with LAENNEC; that the same holds also in respect of rheumatismal pericarditis, which is often attended by little pain, when the adjoining pleura is unaffected; and that the pain is most severe when the costal pleura in the vicinity, and especially when the diaphragmatic pleura, is implicated.

97. *β. The pulsations of the heart* are stronger and more frequent than natural; sometimes regular, at other times irregular, tumultuous, unequal, or intermittent, with exacerbations of the

palpitations. The impulse is then readily felt by the hand, and perceived on inspection. But frequently it can be detected by neither, when copious effusion has taken place into the pericardium; and the palpitations present at the commencement, then disappear. In these cases, the actions of the heart are either really or apparently feebler than natural. M. BOUILLAUD states, that when the inflammation is passing into the formative action — when organisation is commencing in the effused lymph — the second movement of the heart seems double, or imparts a crepitating or crackling sensation to the hand.

98. *γ.* A more or less evident *prominence* of the præcordia, or of the cartilages of the left ribs, mentioned by M. LOUIS, is often observed, especially when the disease affects children. It depends either upon effusion into the pericardium and vascular swelling of the affected tissues, or upon inordinate action and consecutive hypertrophy. The concomitant signs, especially the states of pulsation and impulse, will readily disclose the cause of this appearance.

99. *δ.* *Percussion* furnishes a dull sound to an extent in proportion to the effusion, and at a period of the disease varying with the commencement and progress of this lesion. At first, or in that form of pericarditis called *dry*, but little effusion, or merely a thin membranous exudation of lymph, takes place; and the dulness on percussion is not much increased. Hence it is only when effusion is considerable that this means of investigation is of much assistance in this disease. When the fluid is not abundant, the position of the patient will also modify the extent or situation of the dull sound, or even prevent it from being remarked, owing to the gravitation of the liquid to the more depending part of the pericardium.

100. *ε.* *Auscultation* affords no sign that can be alone depended upon in the acute stage of pericarditis. The sound resembling the *creaking of new leather* is rarely heard in this period, but more frequently in the next. It was first noticed by M. COLLIN, and afterwards mentioned by me in the article AUSCULTATION (§ 41.), where I attempted to explain its occurrence. Dr. W. STOKES next treated of it in an able paper on this disease. I have already alluded to cases in which I have met with it, and one in which it was distinctly heard by the patient herself (§ 15.). In its true form, it rarely, or only temporarily, occurs. But a *friction sound*, which has been noticed by STOKES, MAYNE, WATSON, myself, and others, is frequently heard in this stage, or when little or no effusion exists; and closely resembles the friction, rubbing, or to-and-fro sound in pleuritis. In some cases, the rubbing sound resembles the rasping, grating, or sawing sound in induration of the valves, from which it must be distinguished, as well as from the bellows or blowing sound which is also often heard in pericarditis. When the rubbing sound assumes a grating or rasping character, and is thus liable to be mistaken for similar sounds caused by valvular disease, it will generally be found to arise from the rough surfaces of false membranes covering the surface of the pericardium. In these cases also, M. BOUILLAUD likens the friction sound to the rubbing together of taffeta or of parchment. This kind of rubbing sound is to be

distinguished from the rasping or sawing sound caused by disease of the valves, by its being double, and more superficial and diffused than it. — The *bellows sound*, also, may be confounded with the more superficial and diffused rubbing or crushing sound; but a slight attention will detect the difference between them, arising from the circumstance just stated. This sound, in its different modifications of a filing, sawing, or rasping sound, is always *single* — is a rush, or whiz, as Dr. WATSON remarks, and is synchronous with the systole of the ventricles, and deep-seated; the *rubbing* or *friction* sound, in its different states, is a *double* sound, and suggests the idea of the rubbing together of the opposite surfaces of the pericardium, roughened by the exudation of lymph; it ceases when a copious effusion of serum takes place, or when the surfaces become adherent. Both these sounds are sometimes co-existent, especially when the internal and external membranes of the heart are inflamed at the same time; and they may be then severally ascertained by an experienced and careful observer. I have detected a bellows sound in the larger proportion of cases of pericarditis that I have seen in children. — The *rubbing* or *friction* (STOKES, MAYNE, BOUILLAUD), the *to-and-fro* (WATSON), the *crushing* (BOUILLAUD), and the *ascending* and *descending* (LAENNEC and REYNAUD), sounds, are either the same or slight modifications of the same phenomenon, — are heard chiefly in acute pericarditis, — are double sounds, although louder during the systole than during the diastole of the ventricles, — are caused by changes affecting the pericardium, — are not heard in all cases, and only in certain stages or states of the disease, — and depend upon different lesions from those which occasion the bellows, rasping, or sawing sounds. These latter proceed from alterations *within* the heart, the former from changes *external* to it. — The *creaking* or *leather* sound, according to my observation, occurs chiefly in the chronic stage of the disease; is a different sound from that of rubbing or friction; does not depend upon that cause, but upon thickening and induration of the pericardium reflected over the heart and of the connecting cellular tissue, or upon the existence of a dense or an elastic false membrane, as stated above (§ 15.).

101. When copious effusion has taken place into the pericardium, the natural sounds of the heart, as well as the morbid sounds arising from changes about the valves or in the orifices of the organ, will be heard more obscurely, or at a greater distance and deeper in the chest. — The pulsations will also be found unequal, irregular, intermittent, or laborious, not only on auscultation, but also upon applying the hand over the præcordia. — I have already imputed the bellows sound in pericarditis to changes in the valves and orifices of the heart — to alterations within the organ. This sound has been differently accounted for by Dr. HOPE and others. But it will be found (and Dr. WATSON and M. BOUILLAUD confirm the opinion) to proceed in every case from the cause now assigned; this cause itself resulting from internal carditis preceding, accompanying, or following the inflammation of the pericardium. In such cases, the internal carditis may be limited to the valves or

to the orifices, or may affect both, or may extend also to the surface of one or more of the cavities. When the affection of the internal parts is merely an extension of the inflammation from the pericardium to them, this limitation to the valves and orifices is the more likely to exist. It is manifest from this, that the recognition of the different sounds is of great importance in ascertaining the extent and association of inflammations of the heart.

102. (*b*) The *sympathetic or general symptoms*, when duly weighed, are of the utmost importance in pericarditis, and particularly when estimated in connection with the local and auscultatory signs; but they present the utmost diversity, arising from the intensity and complication of the disease.—*a*. In the acute state, a more or less violent *febrile commotion* is usually observed to follow chills or rigors. The *pulse* at the commencement is generally strong, full, quick, and hard; and the *skin* is hot, but perspirable. The pulse afterwards becomes unequal, oppressed, irregular, small and rapid, and often intermittent, especially at an advanced stage. Sometimes it presents more or less of these latter characters from the first; and the skin is then hot and unperspirable; but occasionally the extremities are cold, or are covered with a cold perspiration. More or less *anxiety* at the præcordia is complained of; and it generally increases, and is almost insupportable, causing extreme restlessness and agitation. *Dyspnœa*, an anxious respiration, and a feeling of overwhelming oppression, are also present, with frequent sighing, which gives momentary relief. If the adjoining pleura is implicated, respiration is hurried, short, and shallow, sometimes interrupted by broken sighs, or by deep catching inspirations. The patient has a sense of suffocation, of constriction, of internal heat, and of fulness in the præcordia, and towards the left side, occasionally accompanied, or alternating, with acute or lancinating pain or with jactitation.—*Cough* is not always present, unless the disease is associated with pleuro-pneumony or pleurisy, and it then has the characters usually observed in these diseases. *Blood* taken from a vein, especially when pericarditis is thus complicated, or when it is connected with acute or articular rheumatism, is cupped and very remarkably buffed, the coagulum being firm. The *pulse* commonly ranges from 120 to 150, and the respiration from 35 to 45, in a minute. *Watchfulness* is generally distressing; and, if the patient fall asleep, he suddenly awakes in a state of agitation and alarm.—The *countenance* is pale, anxious, constricted, and sunk; but it is sometimes, especially as the disease advances, equally pale or equally red; it is always expressive of distress and solicitude. Occasionally the muscles of the face are convulsed, or contracted so as to give rise to the *risus sardonius*. Although strong palpitations are usually present, particularly in the early stage, they are seldom much complained of. The patient generally assumes the supine posture, or lies upon the right side with the head and shoulders considerably elevated. Most of the above symptoms are aggravated by motion, by compression of the chest, by turning on the left side, and by a high temperature. To these supervene, if the disease be not arrested in a very few days, sin-

gultus, sometimes temporary or slight delirium—more rarely maniacal excitement, or attacks of general convulsions. If the malady continue for several days, the face becomes pale, wan, turgid, or livid, and œdema of the extremities and other symptoms indicative of organic change of the heart are observed.

103. *β*. In acute pericarditis, other symptoms, much less constant than most of the above, are often observed; whilst others, which usually attend symptomatic inflammatory fever, as loss of appetite, thirst, loaded or foul tongue, costiveness, and scanty high-coloured urine, are seldom absent. *Vomiting* is an occasional symptom, and is observed chiefly in the most violent cases, and when pericarditis is *complicated* with inflammation of the diaphragmatic pleura. Indeed, the above violent state of constitutional commotion is most frequently seen in this complication, many of the symptoms depending more upon the latter than upon the former. *Hiccup*, delirium, and convulsive motions of the muscles of the face, are also more frequent when the disease is thus associated. The course of this complication is often rapid, and its termination fatal, when its nature is not recognised sufficiently early. When vomiting is urgent, and the pain in the epigastrium is severe, and accompanied by tenderness, the disease may be mistaken for gastritis; and the consequent singultus, and restlessness; the rapid, weak, and irregular pulse; cold sweats on the extremities, &c.; may be attributed to the unfavourable termination of this latter malady. In a case of this kind, which ended fatally in a few hours after medical aid was required, and which I saw only once, the disease was thus mistaken by me. But this occurred many years ago, and in circumstances which precluded a minute inquiry into the local signs.

104. *γ*. Many of the symptoms, also, especially the bellows sound; the rapid, weak, small tremulous, and irregular pulse; the tendency to syncope on motion; the disaccordance between the pulse at the wrist, and the actions and impulse of the heart as felt at the præcordia; the extreme anxiety and restlessness, &c.; may be referred chiefly to the co-existence of inflammation in the adjoining substance of the heart, or in the orifices and valves. Extreme or constant dyspnœa; the dulness on percussion; the weak and diffused impulse of the heart; the obscure or deep-seated sounds, &c.; the smallness, weakness, and irregularity of the pulse; the tumid, bloated, and livid state of the countenance; and the fulness of the jugular veins; are to be attributed chiefly to effusion into the pericardium and pleura, especially into the former. If faintness or syncope occur independently of motion, the pulse nearly disappearing, or becoming tremulous and intermittent, the formation of polypous concretions in the cavities of the heart may be suspected.

105. *δ*. In some uncomplicated cases, acute pericarditis has run its course without the constitutional symptoms having been at any time very severe; but in these, the anxiety, oppression, or constriction at the præcordia; the state of the heart's action, and of the circulation, especially the rapidity and irregularity of the pulse; will arrest the attention of the practitioner, and lead to a more minute examination of the local

signs. The more prominent symptoms of an associated pleurisy, or pleuro-pneumony, may mask those of pericarditis, or the one disease may be mistaken for the other; but as the treatment ought not to be thereby rendered more inert, the consequences will not be serious. When the attention is alive to this complication, and to the points of resemblance between these diseases, the distinguishing characters of each will be generally ascertained: inattention alone will mislead. Even in the most obscure cases of pericarditis, the recognition of one or two symptoms, that cannot fail of taking place, will generally lead to the detection of others which are pathognomonic, if they be properly inquired for; and pain or tenderness on pressure at the left side of the epigastrium, &c. (§ 96.), the morbid sounds discovered by percussion and auscultation, and the disordered state of the circulating and respiratory functions just mentioned, will indicate the nature of the malady. The more acute and fully developed states of pericarditis can be mistaken only for inflammation of the diaphragmatic and left pleura; but a careful observation of the local and general symptoms will readily show the difference between them, and detect them when associated with each other. The sole error that can take place in the diagnosis, when they are thus associated, is to recognise only one of them; but this will not affect the treatment, and not very materially the prognosis. The most serious mistakes are most likely to occur with respect to simple pericarditis, particularly when the local symptoms are slight; for it has occasionally happened that this disease has been found after death, although it was not suspected during the life of the patient. In this case, it is doubtful whether the error in diagnosis has been owing more to the latent nature of the malady, than to the inattention of the medical attendant.

106. *ε*. Pericarditis may, from the commencement, exist in a *slight* or *mild form*, when its detection is very difficult, and it is very liable to be neglected. It then generally assumes a *chronic state*. Owing to the absence of manifest local symptoms, to the slight febrile symptoms attending it, and to the patient's neglect of his ailments, it has also been termed *latent* or *obscure*. Yet the disease may exist in a slow or chronic form, and manifest evident signs of its nature, from its commencement; but this is comparatively rare. The chronic state may also be consequent upon the acute; especially when the latter has been too long neglected, or treated with too little decision, or when the patient's constitution or previous health has been impaired. If, owing to these latter circumstances especially, the inflammatory action has terminated in effusion or in suppuration, the chronic or sub-acute state will often follow, and will generally be indicated by the usual signs of effusion into the pericardium; by pain, however slight, and tenderness in the situations particularised above (§ 96.); by slow fever, characterised by exacerbations in the evening or after a meal; by a frequent, weak, and irregular pulse; by more or less weight, or oppression, or anxiety, at the præcordia; and by a bloated or livid countenance, oedema, &c.

107. (*c*) When *false membranes*, or *adhesions*,

have formed in the course of *chronic pericarditis*, the symptoms are generally obscure, and the diagnosis difficult. The inflammatory action, which produced these changes, with the attendant symptoms, may have subsided, or may not have been clearly manifested at any time. Yet I have met with cases in which the existence of these alterations appeared evident; and chiefly from the following circumstances:—1st. The history of the case, and of the symptoms referrible to the præcordial region, and to the functions of the heart, and of the adjoining organs;—2d. The frequent connection of these symptoms with articular rheumatism;—3d. The presence of a true creaking sound, or a sound resembling that produced by new leather;—4th. An undulation or pulsation observable at the termination and to the left of the ensiform cartilage of the sternum, the upper and left part of the epigastrium being drawn inwards and upwards at each systole of the heart; a similar appearance being sometimes also observed in the intercostal spaces of the left floating ribs, particularly in thin persons;—and, 5th. A superficial and diffused scraping or rough friction sound heard upon auscultation.

108. The connection of the true *creaking sound* with thickening of the cardiac portion of the pericardium, or with a dense and elastic false membrane formed on its surface, has been already noticed (§ 100.). The undulation or *pulsation* in the situations just mentioned has been observed by me in two or three cases, and in the very remarkable instance above alluded to (§ 12.), where the lower part of the sternum and the anterior margins of the left lower ribs were drawn inwards, or towards the spine. The *scraping sound* occurs only when the productions on the surface of the pericardium have assumed an unequal, cartilaginous, or even an osseous form; and when the symptoms referrible to the heart have existed for a long time. But in most of the cases in which I have observed either organised false membranes or adhesions in the pericardium, disease of the valves or orifices, and other organic lesions of the organ, have also been present, as will be noticed in the sequel.

iii. INFLAMMATION OF THE STRUCTURE OF THE HEART. — SYN. *Carditis*, *Carditis vera*, *In-candentia Cordis*, Auct. var.; *Inflammation of the Substance of the Heart*, *True Carditis*.

109. CHARACT.—*Acute fever, with burning pain or soreness in the cardiac region, with tenderness on pressure, particularly at the epigastrium; palpitations, tumultuous and very irregular actions and intermissions of the heart, succeeded by swoonings, &c.*

110. I have ventured to state the symptoms which seem most characteristic of inflammation of the substance of the heart, although the histories of cases, where this disease was the most unequivocally present, have very rarely been observed with any degree of precision; the local symptoms having been altogether overlooked. One of the most remarkable instances of carditis on record, as respects the appearances after death, conveys no information, as to the history of the disease, further than that it was obviously connected with articular rheumatism; so palpable a circumstance even as this having escaped the person who treated the case (*Med. Chirurg. Trans.* vol. vii. p. 319.). In true carditis, the cellular tissue connecting the other textures

seems to be principally affected. Some doubts, however, have been entertained as to the inflammation commencing in this tissue; but there is no reason that it should not originate in this, as in the other textures of the organ. It is very probable that it most frequently begins in either the internal or the external surface, and extends thence to the connecting cellular tissue, and to the whole parietes of one or more compartments of the organ. It may even commence both in the substance and in either of the surfaces simultaneously; it certainly is very rarely or never limited to the former; inflammation of the substance of the heart being always accompanied with pericarditis or with endocarditis, or even with both.—The appearances after death, as well as the symptoms, vary remarkably according to the intensity of the morbid action in relation to the constitutional powers, to the previous health of the patient, and to the extent to which the different compartments and constituent tissues of the organ are affected by it.—The consequences and terminations of the disease depend also upon the same circumstances.

111. *A. Structural Lesions in True Carditis.*—The earlier changes consequent upon inflammation of the substance of the heart very rarely come before the pathologist; and even the more remote are seldom observed. In all the cases adduced by HILDANUS, STOERCK, MECKEL, and CORVISART, the pericardium was also inflamed; but the state of the muscular structure of the organ has been very imperfectly described by them.—*a. Collections and infiltrations of pus* in the substance of the heart have been very rarely observed. In only two or three cases has the purulent matter been found encysted. In most instances, these collections seemed to have been consequent upon acute or sub-acute inflammation; the structure of the organ being of a reddish brown hue, softened, and injected. In other cases, especially when the matter was surrounded by a distinct cyst, the symptoms were less acute, and those referrible to the heart much less prominent, or altogether latent. In nearly all the instances where this product of inflammation was found, the surfaces, or the valves or orifices, also presented indications of their participation in the morbid action.*

* 1. CORVISART (*Opus cit.* obs. 37.) adduces a case in which, after fever attended by dyspnoea, pain in the head, præcordia, and left thorax, with anxiety, a feeble, irregular, and intermittent pulse, and delirium, death took place on the seventh day. The pericardium was found distended by purulent matter, the structure of the heart being softened and infiltrated with a similar substance.—2. In a very instructive case recorded by M. RATKEM (*Bullet. de la Faculté*, l'an. 1809.), violent pain and anxiety in the cardiac region, palpitations, dyspnoea, and leipothymia, consequent upon rheumatism and rigors, were complained of. To these were added, a bloated and anxious countenance, distension of the jugular veins, small and frequent respiration, irregular and excited action of the heart, pain at the epigastrium, and vomitings, followed by delirium, and by death about the fourteenth day. The heart was found large and flabby. Signs of inflammatory action were observed in its left valves, and orifices. Its substance was of a reddish brown hue, injected, and contained three or four small collections of an opaque sanious pus.—3. M. SIMONET has recorded a case in which the disease was connected with rheumatism. When the patient was brought to the hospital, the action of the heart was tumultuous and extensive, the pulse contracted and irregular, the respiration difficult, and the extremities cold. Bloodletting was practised; but he died a few hours afterwards in a fit of syncope. Purulent collections were found in the substance

112. *c. Gangrene* consequent upon true carditis has been noticed by SENAC, CORVISART, PORTAL, LEROUX, and KENNEDY. It is manifestly a *post mortem* alteration, accelerated by a depraved habit of body. All the cases adduced by these writers show that the inflammation of the heart was preceded by serious constitutional disturbance, and by a morbid state of the circulating fluids, that had favoured the occurrence of this termination, which had taken place either at the moment of dissolution, or soon afterwards. M. PORTAL states that, when the muscular structure of the heart becomes gangrenous, it is softened and impregnated with an ichorous and greenish serum, and that it exhales a fœtid odour. He believes that it may even be the seat of a kind of dry gangrene, and adduces a case in support of this opinion:—A man, of about fifty, in the course of a periodic fever, experienced palpitations and other signs of cardiac disease. He died somewhat suddenly; and, on dissection, the substance of the heart was found to be remarkably soft, and friable. It exhaled a putrid odour, was easily torn, and was devoid of serum.—The instance adduced by Dr. KENNEDY was characterised during life by previous cachexia; by burning heat at the præcordia, ushered in by rigors; by exhaustion, restlessness, and extreme anxiety; by dyspnoea and palpitations; by a small, hard, rapid, irregular, and, lastly, intermittent pulse; by a parched, rough, and black state of the tongue, mouth, and fauces; by leipothymia; and by other symptoms of putro-*adynamia*. Eight hours after death, the heart was found remarkably dark; its substance break-

of the heart, especially in the interventricular partition. The internal surface of the cavities was red in several places; the muscular structure being of a yellowish grey hue, softened, and torn with the least effort. (BOUILLAUD, *Op. cit.* p. 266.)—4. Dr. GRAVES was consulted by a gentleman, fifty-five years of age, who had complained, for many months, of palpitations and dyspnoea, and more recently of anasarca. Severe pain and anxiety were felt at the region of the heart, the former darting over the chest. Dr. GRAVES detected hypertrophy and dilatation of the ventricles, with a loud bellows sound, the purring tremor, and a very irregular pulse; and inferred the presence of disease of the valves. The patient died suddenly a few weeks afterwards. There were found considerable effusions of serum in both pleural cavities, enlargement of the heart, and adhesion of it to the pericardium by bands of coagulable lymph, which were strong at the apex. At this situation, was discovered a cavity in the muscular structure, with a regularly defined wall, which contained about two ounces of pus. The parietes of both ventricles were greatly thickened. All the valves were more or less affected. The valves of the aorta were nearly altogether ossified. (*Lond. Med. and Surg. Journ.* vol. vii. p. 803.)—5. In a case detailed by M. C. BROUSSAIS (*Annal. de la Méd. Physiol.* t. xxi. 1832.), the abscess in the substance of the heart was encysted.—A soldier, nineteen years of age, was attacked with small-pox, in the course of which abscesses, enormous infiltration of the left arm, probably caused by a consecutive phlebitis, &c., supervened. A constant fever, with anxiety, marasmus, &c., ultimately became the principal symptoms. He died on the fifty-fifth day from the attack. An abscess, of the size of a filbert, was found in the muscular substance of the left ventricle, near its base. The matter consisted of well digested pus, which was contained in a consistent cyst.—6. M. LAENNEC found a similar abscess in the substance of the left ventricle of a child who died of pericarditis. A case resembling the foregoing is also recorded by HENNING (HUFELAND'S *Journ. der Pract. Arzneyk.* b. vii. st. iv. p. 144.). Two cases are recorded by M. MARECHAL, in which purulent collections were formed in the cavities of the heart, connected with their internal surface, and surrounded by a thin friable membrane. The patients had experienced symptoms referrible to the heart during the latter days of existence. (*Journ. Hebdom. de Méd.* t. ii. p. 49f.)

ing down, when pressed gently with the finger. It exhaled a putrid odour; no blood exuded from its vessels; and all its cavities were empty; the large thoracic and abdominal veins being loaded with black grumous blood.

113. *b. Softening* of the substance of the heart is one of the earliest alterations consequent upon inflammation of it; but softening, unconnected with vascular congestion and discolouration, cannot be altogether attributed to this state of morbid action. The *reddish brown softening* sometimes observed is manifestly owing to the most acute form of inflammation; the muscular substance of the heart being of a reddish, brownish, or livid hue, and the connecting cellular tissue injected or engorged with dark blood. Sometimes blood, of a very dark colour, and more or less altered, is found infiltrated between the muscular interstices, or underneath the serous membranes covering the internal and external surfaces of the organ; these membranes participating in the morbid action. In a case examined by Mr. STANLEY, the muscular fibres were found of a very dark colour, of a very soft and loose texture, and easily separated and torn by the fingers; the nutrient vessels being loaded with venous blood. A section of the ventricles presented numerous small collections of *dark-coloured pus* among the muscular fasciculi. Some of these were seated near to the cavity of the ventricle, while others were more superficial, and had elevated the reflected pericardium from the heart. The muscular fibres of the auricles were also softened, and loaded with dark blood.

114. *d. M. BOUILLAUD* has described two other varieties of softening of the heart, which he believes to arise from inflammation. In the one, the muscular structure is of a *whitish*, or *pale grey*, colour; in the other, it is of a *yellow* hue. — *Whitish* or *greyish* softening he supposes to be the second stage of the reddish brown softening; and to indicate a further advanced stage of carditis. That such is the case, appears partly proved by its connection in some instances with suppuration, or purulent infiltration of the muscular tissue of the organ, although attended by much less vascular injection and congestion, than the reddish brown softening. CORVISART remarks, that carditis renders, after a time, the muscular structure of the heart soft and pale; the fibres losing their cohesion, and the connecting cellular tissue becoming loose, or infiltrated by a lymphatico-puriform matter. The parietes of the heart are torn with the greatest ease, and are broken down with the least pressure. (*Op. cit.* p. 257.)

115. The *third* variety, or *yellowish* softening of LAENNEC and BOUILLAUD, often is manifestly connected with chronic true carditis, although by no means generally. It differs from the former (§ 114.) only in its yellow colour; and is most frequently greatest in the interventricular septum, and the centre of the muscular structure of the ventricles; the parts nearest the internal and external surfaces of the organ being less evidently changed, or presenting reddened points of the healthy consistence. — The second of these forms of softening was observed by me in a patient who died of the consequences of inflammation of the membranes of the spinal chord, many months after having experienced an attack of acute car-

ditis, connected with articular rheumatism (see *Lond. Med. Repos.* vol. xv. p. 26.); and, judging from the appearances in that instance, this softening seemed to result from a change in the nutrition of the organ, consequent upon the antecedent inflammation of it. BOUILLAUD considers, that its frequent coincidence with purulent effusion into the pericardium, shows that it depends upon this latter circumstance. The juster inference would be, to impute both the change in the substance of the organ, and the morbid secretion from the pericardiac surface, to perverted vascular action, conjoined with impaired organic nervous power. That these are the true pathological conditions, is shown by the circumstances in which this, as well as the yellowish variety of softening, is found. — I have observed them both, — this latter variety especially, — where there had been no evidence of cardiac disease, either at any previous period, or in a chronic form; and particularly in cases of general cachexia, and of constitutional disease, attended by discolouration of the surface of the body, — by a bloodless, yellowish, or tallowy or waxy appearance of the integuments, — and by other signs of a poor and deficient state of the blood, consequent upon impaired organic nervous energy and assimilation, as generally seen in the advanced stages of local malignant or contaminating maladies.

116. *e. Ulceration of the heart* may arise from an abscess, encysted or non-encysted, having opened either into one of the cavities, or into the pericardium. In the former case, the purulent collection, and the subsequent secretion from the diseased part, mix with the blood; in the latter, they accumulate in the pericardiac cavity, and increase a pre-existent pericarditis. M. BOUILLAUD supposes that they may open both ways, and occasion *perforation* of one of the compartments of the organ. It is more probable that, after opening in one direction, the tissue surrounding the abscess gives way, owing to the loss of substance, and to the softening consequent upon this lesion. That many of the cases of *rupture* of the heart arise from this circumstance, will appear in the sequel. Ulcerations are generally observed in the internal surface, most commonly in that of the left ventricle. Inflammation having commenced in, or extended to, the connecting cellular tissue, and having given rise, at one or more points, to an effusion of a serous or puriform fluid sufficient to detach the internal membrane from its vascular connections, this membrane necessarily loses its vitality at these points, and yields before the matter underneath it. Erosion of the endocardium, followed by ulceration, and limited softening, &c. of the substance of the organ, is thus produced; the number, extent, and depth of the ulcers being various.

117. Ulceration, in its course through the substance of the heart, gives rise to changes analogous to those observed after ulceration of arteries. The thinned and softened portion of the parietes yields before the pressure made upon it by the column of blood, and a *sacculated aneurism*, or *tumour*, varying from the size of a filbert to that of a large orange, is formed, — its cavity, as in the case of other aneurisms, being often in a great measure filled with lamellated coagula. The aneurismal tumours, consequent upon ulcer-

ation, generally form adhesions between the opposed surfaces of the pericardium stretched over them, their rupture being thereby prevented. They have been found only in the left ventricle; and, according to M. BRESCHET, the summit of the ventricle is their sole seat; but M. REYNAUD has shown, by the analysis of thirteen cases, that seven are exceptions to this rule.

118. *f.* *Perforation* of the parietes of one of the compartments of the heart may occur in either of the ways above described: from ulceration consequent upon abscess; from simple ulceration following inflammatory action; or from ulceration attended by an aneurismal tumour. It seldom or never, perhaps, proceeds from the last of these, for the reason just assigned; and whenever it does take place in either of the former cases, rupture or laceration of the remaining inflamed and softened tissues in the seat of ulceration usually takes place. When the perforation is made into the pericardium, death occurs suddenly; but when it is seated in the interventricular septum, then an admixture of arterial with venous blood results, and life may be prolonged for some time.—Instances of perforation from ulceration have been recorded by RULLIER, ANDRAL, and others. M. MARVEJOLS met with this lesion in the left auricle.

119. *g.* *Induration and cartilaginous and osseous transformations* of the substance of the heart are doubtless amongst the more remote or chronic lesions consequent upon carditis. Simple *induration* varies in degree and situation, and is generally limited to, or is most remarkable in, a single compartment. It may be seated in the parietes of a ventricle, or in those of an auricle, or in the septa, or in the fleshy columns. CORVISART, LAENNEC, and BROUSSAIS have observed it to equal that of the shell of a nut. It is, however, most frequently characterised by a transformation into a *cartilaginous*, or an *osseous*, or *osseo-calcareous substance*, and limited to a portion only of a compartment. The connecting cellular tissue, especially that beneath either of the membranes, seems to be the original seat of this change, the muscular fibres being atrophied, from the pressure of the indurated, hypertrophied, or transformed cellular tissue connecting them. The cartilaginous and osseous degenerations of a portion of the substance of the heart, have been observed by MORGAGNI, HALLER, SENAC, CORVISART, BAILLIE, FILLING, RENAULDIN, BICHAT, BERTIN, and many others. They are, however, much more frequently met with in the pericardium. The most remarkable instance of ossification of the muscular structure of the heart is recorded by A. BURNS. In general, when ossific deposits are found in this latter situation, they seem to have only extended to it from either of the surfaces, especially the pericardiac; or rather from the cellular tissue subjacent to these surfaces, to that connecting the muscular fasciculi, which become atrophied as the osseous or cartilaginous change proceeds. This seems well illustrated by an interesting case recorded by Mr. SMITH (*Dublin Journ. of Med. Science*, vol. ix. p. 419.).

120. That the change of a portion of the substance of the organ into the cartilaginous or osseous states is actually the result of a form of chronic inflammatory action, seems to be proved

by what is observed in connection with these lesions in other situations, and by the circumstances of their association with increased vascularity and swelling in hypertrophy of the parts in which they are seated, and of their occurrence after undoubted evidences of inflammation had been manifested. That the state of the circulating fluids may, however, be indirectly concerned in the production of these changes, as consequences of chronic inflammatory action, in preference to any other, is not improbable; the superabundance in the blood, owing to impaired eliminating function, of those substances or ultimate products of assimilation, which contribute to the formation of the morbid depositions in question, possibly favouring their supervention.

121. *B.* *The Symptoms and Diagnosis of true Carditis* are so little different from those of internal and external carditis, that nothing precise can be advanced under this head. The circumstance of inflammation of the substance of the heart occurring chiefly as a consequence, or as a complication, of inflammation of either or of both the surfaces, nearly precludes the possibility of distinguishing between it and them, or of ascertaining its existence when thus associated, more especially when the disease exists in a sub-acute or chronic form. This difficulty has been acknowledged by CORVISART, LAENNEC, and BOUILLAUD. M. LAENNEC very justly remarks, that there is not on record a single case of carditis, the symptoms and course of which have been accurately observed. M. BOUILLAUD states, that he has never met with a case of carditis uncomplicated with pericarditis or endocarditis. It has been supposed, that the dark softening of the structure of the heart, so very frequently observed after death from adynamic or putro-adynamic fevers, has been owing to the complication, or supervention, of inflammation of this organ. The uncommon frequency of the pulse in many of these cases has been considered as evidence of this; yet the slighter forms of simple endocarditis would give rise to the same symptoms; and these, very probably, not infrequently occur in the course of those fevers—modified, however, by the constitutional malady; although in general the heart's substance undergoes no further change from them than other organs. In the advanced stages, or near the termination of these diseases, the heart participates in the alterations which take place in muscular parts generally, and becomes more or less softened and discoloured. This change, however, is independent of inflammation, and is the consequence of extremely depressed vital power, and impaired cohesion of the soft solids (see FEVER, § 18.102.), in connection with deterioration of the circulating fluids. This change of the substance of the heart is also not infrequent in cases where the blood has been altered by the absorption of morbid matters, or by the infectious operation of putrid and contaminating fluids and miasms. I have remarked it in the putro-adynamic, or luescent form of remittent fever endemic in low marshy districts within the tropics, and in the more malignant states of puerperal fevers, especially those met with in crowded or ill-ventilated lying-in hospitals (see PUERPERAL DISEASES). Several writers on the plague state that they have observed it in fatal cases of that pestilence. I also have found it after death

from pestilential yellow fever; and in a slighter degree from pestilential cholera. (See art. PESTILENCES.)

122. *a.* Notwithstanding the difficulty of determining the existence of carditis, during the life of the patient, Drs. HEIM and KRAUSE believe that a diagnosis may be made in some instances; and, judging from two cases, in which I was consulted, and in which the opinion as to its nature was confirmed by the appearances observed after death, I nearly concur with them, especially if the disease exist in a very acute and fully developed form. In this case, the patient experiences a violent pain in the region of the heart, with anxiety, preceded or attended by rigors, chills, or tremblings of the whole frame. To these succeed increased heat about the præcordia, or in the trunk, whilst the extremities and face are cold, and the whole surface is covered by perspiration, which is cold on the extremities. The pain is concentrated in the situation of the heart, is lacerating or rending, accompanied by the utmost agitation and expression of anxiety and distress, sometimes by screams, and occasionally by general convulsions and swoonings. The patient feels every pulsation of the heart, rolls about to obtain ease, and presses his hand forcibly against the præcordia. The chest is elevated, the head thrown back, and the face and hands covered with cold sweats. There is great thirst, but drink is refused on its reaching the lips; and there is often loquacity, passing into delirium as the disease advances. If no vascular depletion has been practised, the pulsations are indistinct, or fluttering, or tumultuous. After bloodletting, the action of the heart becomes more developed; palpitations, attended by intense suffering, occasionally take place, and, at other times, syncope supervenes, or they both alternate. Immediately upon opening a vein, syncope or convulsions are apt to occur; but, upon placing the finger on the orifice till the patient recovers, the depletion can be carried to a great amount, with relief to all the symptoms. The pulse varies remarkably, but is generally unequal or irregular, and remarkably small and weak, or indistinct. There is neither cough nor expectoration, nor vomiting; but a frequent expression of pain and distress. The pain is increased by each contraction of the heart, so as to cause the patient to complain of palpitations, even when the impulse is not sensibly increased. If the disease is not soon arrested, constant jactitation, or tremor, recurring fits of syncope, delirium, and death, take place; or, in consequence of the association with it of inflammation of the internal or external membranes, and of the effusion of lymph, the phenomena, local and general, observed in the advanced stages of internal and external carditis, supervene and constitute the chief characteristics of the malady. When acute carditis is associated with either of the other varieties, or passes into them, then the local and physical signs proper to each will be detected accordingly on percussion and auscultation.

123. These are the most constant phenomena of acute carditis, according to the description of Dr. HEIM, and the history of two cases which fell under my observation. The seizure is generally sudden, and the disease reaches its acme about the third day. In one of my cases, death

took place on the fourth day. The patient (who was attended also by Dr. WALSHMAN and another practitioner) was about fifty years of age, and of a full habit of body. In the spring of 1821, whilst labouring under an attack of rheumatism, he was recommended by some person to take a strong dose of croton oil. He took three drops, which produced violent purging and vomiting. The rheumatism suddenly ceased, and was speedily followed by the most distressing pain and anxiety in the region of the heart, and entirely confined to it. There was no morbid sound on auscultation, although nearly all the symptoms enumerated above were present. The patient was repeatedly bled, but extreme restlessness and jactitation appeared, and death by syncope soon afterwards took place. On dissection, the pericardium presented hardly any signs of inflammation; but the substance of the heart was inflamed, and portions of the internal surface more slightly. The alterations, however, were not so extensive as was anticipated; probably owing to the activity of the treatment, as medical aid was promptly procured and the disease at once recognised, and to the rapidity of the fatal termination. In the other case, which occurred more recently, and which was of longer duration, dark softening, as described above, was very remarkable, with the usual products of inflammation on both the internal and external membranes, particularly the latter.

124. *b.* The consecutive alterations on true carditis are even more occult than the acute stage of the disease itself. Indeed, as these alterations most frequently proceed from a sub-acute or chronic state of carditis, or from inflammation limited to one or two compartments of the organ, their greater obscurity is to be anticipated. When *abscess* or *ulceration* is followed by *perforation* or *rupture*, then sudden death takes place, unless the alteration occurs in the interventricular septum. But the symptoms attending these lesions, previously to their reaching a fatal extent, have not been ascertained; and it is doubtful whether or not they admit of being distinguished. It is necessary to this end, that cases of this kind should be carefully observed, and accurately described; but there is none on record possessed of either of these qualities. The same observations apply to the *sacculated dilatation* or *aneurism* of the heart (§ 117.), consequent upon ulceration or abscess. In none of the cases of it which have been published, was this lesion either discovered or suspected during life. M. BRESCHET mentions only the signs that may be expected to occur, not those which have been actually observed; and M. BOUILLAUD advances no further. In the case detailed by M. REYNAUD, an affection of the heart was never indicated, the patient having died of a severe nervous disease, caused by the oxyde of lead, in a manufactory where he wrought; and the cases adduced by the authors referred to hereafter furnish quite as little information.

125. *c.* Softening of the heart, consequent upon various grades of inflammatory action, is indicated by a few symptoms, which, when duly weighed in connection with the previous history of the case, may lead the acute physician to presume its existence with some truth. These symptoms, however, taken by themselves, often attend other diseases characterised by extreme

asthenia, and even the asthenic functional disorders of this organ (§ 39.). But when, after more or less acute or sub-acute symptoms referrible to the præcordia, especially if attended by any of the morbid sounds, or other physical signs observed in external or internal carditis, or after dyspnœa, &c., the impulse of the heart at the præcordia, and the pulse at the wrist, become obscure, weak, and irregular; the latter being small or indistinct, the face livid or tumid, and the extremities œdematous, the dyspnœa increased or more constant; and when fainting or syncope occur frequently, or from very slight causes—then softening of the muscular structure of the heart may be presumed. Still all these symptoms may depend upon effusion into the pericardium, which, however, is often associated with softening of the organ. But a careful examination of the chest by percussion and auscultation, and the diagnostic symptoms adduced in the article on DROPSY OF THE PERICARDIUM (§ 151.) will often lead to a just conclusion. The softening of the heart, which, in a slighter degree, may be presumed to exist during convalescence from low or malignant fevers, is generally attended by a small and quick pulse, by a very weak and limited impulse, and by frequent returns of faintness or syncope. In the softening observed in very old people, the pulse is often slow, feeble, indistinct, or intermittent, or irregular; and dyspnœa, with many of the symptoms just mentioned, is generally present.

126. iv. *Of the CAUSES and Developement of Inflammations of the Heart and Pericardium.*—Inflammations of the surfaces and substance of the heart arise from the same predisposing and exciting causes. When either of these forms of carditis proceeds directly from these causes, or independently of a pre-existing malady, it has been denominated *primary* or *idiopathic*; but when it has followed another disease, and when a connection can be traced between both, it has been called *consecutive* or *symptomatic*. The causes already adduced, under the heads of *predisposing* (§ 18.), and *exciting* (§ 19.) are principally concerned in the production of the primary states of these inflammations. Some of those which have been termed *pathological* (§ 20.) chiefly occasion the consecutive forms of carditis.

127. A. *Of the predisposing causes* (§ 18.) already stated, plethora, the rheumatic and arthritic diathesis, the irritable and sanguineous temperaments, hereditary constitution, mental emotions, and early age, seem to be most concerned in producing inflammations of the heart and pericardium. Although these diseases may occur at any age, yet they are most frequently met with between the ages of six and thirty-five. M. BOUILLAUD assigns the period between ten and thirty as that of their most common occurrence. I have, however, observed a large proportion of cases between five and ten years of age, and after thirty. I agree with him in considering them most frequent at those seasons when the vicissitudes of temperature and season are the greatest; and I may add, during spring, when north-east winds are most prevalent.

128. B. *The exciting causes* (§ 19.) comprise nearly all those just referred to; especially the mechanical, the traumatic, the physical, and the moral, exciting causes.—Of the *physical* causes,

the most common are—exposure to cold when the body is perspiring, or after it has been much overheated or excited, and wearing damp clothes or sleeping in damp sheets or beds. The impression of cold after the copious transpiration and exhaustion caused by bodily or mental exertion, or by both conjoined, is very apt not only to produce inflammation of either of the surfaces of the heart, but also to occasion pneumonia or pleuritis to be associated with it. A young man of talent, after addressing a meeting under great mental excitement for upwards of an hour, exposed himself immediately to a cold easterly wind in the month of March; and was soon afterwards seized with pericarditis, complicated with pleuritis of the left side. A middle-aged man, after great muscular exertion and fatigue, allowed himself to be suddenly chilled: he was afterwards attacked by internal carditis, which soon became associated with pericarditis. The dangerous and often fatal consequences of violent or prolonged exertions in working the pumps of leaky or sinking vessels, are generally owing to the production of this malady in its most acute form. Of the truth of this, the author had, many years ago, a painful opportunity of assuring himself. The *moral causes* enumerated above (§ 19. (c)), and in the article DISEASE (§ 53.), sometimes either induce, or concur with other causes in occasioning, one or other of the forms of carditis.

129. C. The pathological states which have been adduced (§ 20.), are by much the most common causes of inflammation of the internal and external surfaces of the heart; and of these the most frequently observed is *rheumatism*, particularly the *acute articular form* of that disease. Internal or external carditis may be connected with rheumatism in *three* modes:—1st. The cardiac inflammation may follow the disappearance, or suppression, of the rheumatic affection, and may thus appear as a *metastasis*, or translation of this affection;—2d. It may take place before the rheumatic disorder has ceased in an extremity or external part of the body; and co-exist with this disorder in one or more joints, or in these situations, the external affection being, however, much less severe after the developement of the cardiac malady;—3d. Rheumatism may extend itself to the heart or pericardium, without abatement in its external seat, or may affect, almost simultaneously, one or more joints and the heart; or a very acute arthritic rheumatism may mask a sub-acute internal or external carditis. Of these three modes of connection, the first and second are the most frequent; but the third is by no means rare. I believe that the more acute the rheumatic complaint, and the more it affects the joints, the greater is the risk of its occasioning carditis or pericarditis; the risk being also greater, the younger the patient: and I am moreover of opinion, that this connection between inflammations of the heart and rheumatism is much more frequent at the present day, than twenty years ago. Twenty-three years since, when I published a dissertation on rheumatism, and had my attention as alive to this circumstance as now, and with equal opportunities of meeting with it in public institutions, it was much less frequently observed. The modes of ascertaining it have certainly been improved

since then; but nearly as much now is often lost by inattention to the physiological or rational symptoms, as is gained by ascertaining the physical signs. Besides, as I have always resorted to auscultation and percussion since 1819, when I frequently accompanied LAENNEC in his rounds, the disease was almost as likely to have been detected by me then as now.

130. The next most frequent pathological conditions whence carditis, especially external carditis, may proceed, are *pleurisy* and *pleuro-pneumony*. The former disease may occur in consequence of the extension of the latter; or they may both appear almost simultaneously. I have even seen pericarditis give rise to, or followed by, pleuritis. Inflammations of the heart, thus associated, are most commonly caused by some one of the numerous modes in which cold is applied to the surface — or rather in which the animal caloric is carried off — when the body is perspiring, especially after exertion or fatigue, and in the rheumatic diathesis. — *Gout* is also sometimes a cause of carditis; and, I think, of the internal form of the disease, in preference to pericarditis. Internal carditis occasionally appears at an advanced stage of, or during convalescence from, either of the eruptive fevers. It, as well as other forms of the disease, may also follow other fevers, and the complaints mentioned above (§ 20.).

131. v. *The DIAGNOSIS of Inflammations of the Heart*, may be inferred from the description I have given of the symptoms attending each of the varieties; but as these varieties are often associated with each other, or in some measure pass into one another, as the inflammatory action predominates more or less in one of the constituent tissues of the organ, so the symptoms will vary in different cases, and even in different periods of the same case. Attention, however, to the following circumstances, and groups of morbid phenomena, will generally enable the practitioner to arrive at a tolerably just conclusion as to the nature of the disease: — 1st. The situation of the pain, in the more acute cases, and the tenderness, soreness, or pain on pressure felt in the left and upper part of the epigastrium, and in the left anterior intercostal spaces; — 2d. The increase of pain on stretching upwards or backwards, and the inability to lie on the left side; — 3d. The frequent extension of pain to the left axilla, shoulder, or arm, and the occasional numbness of the latter; — 4th. The greatness of the anxiety in proportion to the cough; the anxious, haggard, or peculiar expression of countenance; and the bloated or livid appearance of the face at a more advanced stage; — 5th. The state of the pulse at the wrist examined in connection with the actions and impulse of the heart; the great frequency and irregularity of the latter, and the smallness, weakness, &c. of the former; — 6th. The palpitations and tendency to syncope, or the alternation of these symptoms, and their connection with pain, anxiety, dyspnoea, restlessness, or jactitation; — 7th. The signs on percussion and auscultation, especially the *single bellows* or *blowing sound*, with all its modifications; and the *double friction*, rubbing and creaking sounds: the former having reference to changes within the heart; the latter to alterations within the *pericardium*.

132. vi. *The COMPLICATIONS of Inflammations*

of the Heart have been already noticed in general terms (§ 32.). Inflammation of the *internal membrane*, whether acute, sub-acute, or chronic, is often associated with, or gives rise to, *pericarditis*, at an early period of its progress; but this latter is much more frequently complicated with, or occasions, the former. Signs of endocarditis are more commonly and more early detected in the course of pericarditis, than those of pericarditis are in the course of endocarditis; and both may be further associated with inflammation of the cellular tissue or substance of the heart, or *true carditis*, in various degrees, or to a greater or less extent, as respects the different compartments of the organ. — A. *Internal carditis* is much more commonly observed in a complicated than in a simple state, especially when it is at all advanced. It presents itself in connection with the following diseases and probably in a ratio of frequency approaching the order in which I am about to enumerate them: — 1st. With pericarditis and articular rheumatism; — 2d. With pericarditis only; — 3d. With rheumatism only; — 4th. With pneumonia, pertussis, and pleuritis; — 5th. With inflammation of the bloodvessels, especially phlebitis; — 6th. With eruptive, or adynamic fevers; — 7th. With purulent collections or caries in distant parts. Internal carditis, when associated with rheumatism or with pulmonary or pleuritic diseases, is generally also connected with pericarditis; but when it supervenes in the course of phlebitis, or of fever, or from some cause which contaminates the circulating fluids, then it is generally unconnected with pericarditis, although the substance of the heart may be more or less implicated, or even softened.

133. B. *Pericarditis* is also much more frequently met with, even in its early stages, in a complicated than in a simple form — generally in connection — 1st. With internal carditis, either acute or chronic; — 2d. With articular rheumatism; — 3d. With both internal carditis and rheumatism; this being oftenest observed; — 4th. With pleuritis, either pulmonary, diaphragmatic, or costal; — 5th. With pleuro-pneumony; — 6th. With inflammation of the diaphragm or mediastinum; — 7th. With true carditis; — 8th. With peritonitis; — 9th. With inflammation of some one of the abdominal viscera; — and, 10th. With eruptive fevers. Two or more even of these complications may exist in the same case, especially internal and external carditis, pleuritis and articular rheumatism; pericarditis, diaphragmitis, and pneumonia, &c. A body was lately brought into the dissecting-room of the Middlesex Hospital medical school, in which the liver was found inflamed and enlarged. It had formed adhesions with the diaphragm on one side, and with the adjoining viscera on the other. Between these viscera and the concave surface of the liver, the adhesions formed a large sac containing a turbid serum. The *pericardium* and diaphragm were inflamed, as well as the pleura on both sides. The pericardium and pleural cavities contained much turbid thick serum. — When pericarditis is associated with peritonitis or with inflammation of some of the abdominal viscera, the additional complication of pleuritis, especially diaphragmatic pleuritis of the same side, is not infrequent. BOUILLAUD adduces an instance of splenitis, diaphragmatic

pleuritis of the left side, and pericarditis, in the same patient. The opinion of CORVISART, that acute pericarditis rarely or never exists without being complicated, in some period or other of its course, is very nearly if not altogether true. — C. Of the complication of *true carditis* little further need be added. It can hardly exist without more or less inflammation of one or both surfaces of the heart; and in the few cases of it that have been observed, several were also connected with rheumatism, with pleuro-pneumony, with eruptive and other fevers, with phlebitis, and with purulent or sanious matters absorbed into the circulation.

134. vii. *Of the PROGRESS, Duration, and Terminations of Inflammations of the Heart.* — A. — a. *Internal carditis* may be *acute*, *sub-acute*, or *chronic*, and all the intermediate degrees. The most acute form may, especially from the effects of treatment, assume a mild and very chronic state; and this latter state may acquire greater activity, and become much more severe or acute. This latter change is, however, less frequent than the former. Where an amelioration has taken place, a recurrence or exasperation of the acute symptoms is very apt to occur. The most acute cases, M. BOUILLAUD observed, arose from sudden chills whilst the body was perspiring, chiefly in persons of the lymphatico-sanguine temperament, and employed in laborious occupations; hot stimulating liquors, taken with the view of recalling the perspiration to the surface, having assisted in developing the disease. When the less severe cases appear in connection with rheumatism, as they often do, in one or other of the modes above stated (§ 129.), a stimulating treatment of the latter disease renders much more acute the cardiac affection.

135. b. *The duration of endocarditis* is most indefinite, and altogether dependent upon the severity of the disease, the habit of body, age, strength, and constitution of the patient, the nature of the complication, the mode of treatment, and the period of recourse to it. — *Acute endocarditis* may terminate fatally in two or three days; and in this case, death is caused chiefly by the formation of fibrinous concretions, or coagula, in the cavities of the heart. When complicated with pericarditis, or with pleuro-pneumony, its duration will generally accord with that observed in these diseases. — The slighter or more *chronic forms* of internal carditis are of long duration, the more concealed states being prolonged indefinitely, or even for years; and organic lesions, especially of the valves and orifices of the organ, are usually the result at more or less early periods of their course. The inflammatory action either subsides or entirely ceases, after having produced these lesions, or it still continues in an obscure form. In the former case, especially when the amelioration proceeds from judicious treatment and regimen, the disease may remain, even for years, either stationary or more or less mitigated; but, in the latter, it generally advances with varying degrees of rapidity, until the functions of the organ and of the adjoining viscera are more or less impeded, or altogether interrupted; or until fatal congestions take place in vital parts, or dangerous effusions of blood or of serum supervene in important organs, or from mucous or serous surfaces.

136. B. — a *The progress and duration of pericarditis* also vary with the causes which occasion the attack, with the age, temperament, and habit of body of the patient; and with the morbid connections and treatment of the disease. — The most *acute form* may terminate fatally with great rapidity. M. ANDRAL records a case which was fatal in twenty-seven hours. The celebrated MIRABEAU was carried off by it so rapidly as to lead to the suspicion of his having been poisoned: he was only improperly treated, although in the usual manner at that time in France. Such violent cases are generally complicated, either with internal carditis, or with pleuritis, diaphragmatis, &c.; or with two or even more of these inflammations (§ 133.). The more moderate or favourable cases, however, generally terminate about the seventh or ninth days, or between the seventh and fourteenth. But there are exceptions to this. — The slighter and more *chronic grades* of pericarditis may continue for some months; and the consequences, particularly adhesions, connecting the pericardium, partially or generally, to the surface of the heart, may remain much longer, or for years; and, in some cases, especially when these lesions are slight, without materially disturbing the health. These adhesions are frequently attended by increased redness of the membrane, and by a little turbid serum, unless when they have obliterated all remains of the cavity. BERTIN, EL-LIOTSON, and BOUILLAUD, believe that they do not occasion, even when general, any inconvenience beyond what proceeds from other co-existent lesions. But this is too favourable a view. They assist in developing, if they be not already associated with, still more serious alterations of the heart; and these latter frequently occasion other changes, either in collatitious or remote organs, more especially serous or sanguineous effusions; and thereby greatly abridge the period of existence.

137. viii. *The PROGNOSIS of Inflammations of the Heart* ought to be given with caution, generally with reservations, even when the most favourable circumstances are present. — A. In *endocarditis*, in its more severe states, there is always more or less danger; and the danger becomes extreme when the anxiety is very great, when the pulse is very frequent and irregular, and when swoonings or cold perspirations supervene. The slighter or more *chronic states* of the disease might be amenable to treatment, if it were possible to ascertain their presence, before they produce lesions which are but little under the control of medicine. But where these exist, in a manifest degree, the prognosis becomes unfavourable in proportion as they oppose the circulation through the compartments of the heart; death being the ultimate result, although it may be long deferred, and various intermediate changes may occur.

138. B. *Pericarditis* is always a dangerous malady; yet a considerable proportion of the cases will recover, if their nature be early recognised, and if an appropriate treatment be prescribed. M. LOUIS considers that perfect or partial recovery — partial, inasmuch as organic change of some kind remains, particularly adhesions of the pericardium to the heart — occurs in five cases out of six. If, however, the disease,

whether acute, sub-acute, or chronic, has given rise to effusion, an unfavourable opinion ought to be entertained of it, and especially if the patient be far advanced in life, or of a cachectic habit of body. Whether the effusion be puriform, or sero-sanguineous, or pseudo-membranous, or sero-albuminous, the question is chiefly as to the length of time that may elapse before a fatal issue takes place; much depending upon the symptoms and signs indicative of the amount of effusion, upon the states of the pulse and of the respiration, and upon the age and vital energies of the patient. When the effusion follows rapidly upon an acute attack, especially if there has been great frequency of pulse, and depressed constitutional powers, the danger becomes much more impending, than when effusion takes place more slowly and to a less amount. If pericarditis be associated with endocarditis, as indicated by the bellows sound, or by any of its modifications, or with pleuritis, pleuro-pneumony, or diaphragmitis, the danger is thereby increased very greatly — and increased in proportion to the intensity or extent of these inflammations. When the sub-acute or chronic disease has given rise, at more advanced periods, to adhesions, or to false membranes (§ 107.), the actions of the heart and diaphragm may be much disordered, and the functions of respiration, and of circulation in related or remote parts, greatly disturbed; but these consequences are not always observed. Patients have lived for years without much disorder being complained of; although more frequently these functions, particularly the latter, are more or less deranged — impeded circulation, or effusion into some cavity or organ, sooner or later taking place.

139. C. Of the prognosis of *true carditis* it is unnecessary to speak. If it be presumed to exist, the opinion of the result should be unfavourable, inasmuch as a degree of inflammation of the substance of the heart so intense as to be recognisable, generally induces the most serious changes either on one of the surfaces, or in the structure of the organ. If the symptoms of *softening* of the heart (§ 125.) be such as to admit of recognition, with any degree of confidence, the prognosis is extremely unfavourable, unless this lesion have taken place in fever, when a more favourable opinion may be entertained; recovery sometimes taking place during an energetic recourse to tonics, chalybeates, change of air, &c. The other consequences of carditis need not be noticed at this place, as they rarely admit of recognition during the life of patient.

140. ix. TREATMENT OF INFLAMMATIONS OF THE HEART. — The different forms of carditis require very nearly the same means of cure, the chief modifications consisting in the extent to which vascular depletions should be carried, in the various circumstances that usually present themselves; and in the choice of additional agents for averting the more serious changes, which are apt to take place. — A. *Bloodletting* is necessary in the three varieties of carditis, and especially when either of them is associated with pleuritis, or pleuro-pneumony; but the utmost discrimination should be exercised as to its amount and repetitions. In all cases, it should be employed early in the disease, and the quan-

tity of blood taken away ought to be in due relation to the violence of the attack, to the age and constitution of the patient, and to the effects produced. In general, vascular depletion may be carried further in *pericarditis*, than in internal carditis, and in the complicated, than in the simple disease. The practitioner ought not to be deterred from bleeding by the weakness and smallness, or irregularity of the pulse, or by the faintness complained of; nor induced to carry it too far, by the palpitations, and inordinate impulse of the heart, and by the cupped and buffed state of the blood. If carditis be connected with rheumatism, this state of the coagulum will continue, although depletion be carried to inanition. I have seen it greatest in the blood last taken, where I was confident that the depletion had been carried to a very dangerous length. In these cases, the disease is partly in the blood itself; there is a redundancy of fibrine and albumen, and an increased disposition to their coagulation.

141. B. *Internal carditis*, unless when associated with pericarditis, is not so much benefited by very large bloodlettings, as may be supposed, although decided depletion, especially early in the disease, is required. M. BOUILLAUD thinks that this treatment should be carried further in endocarditis, than in pericarditis: but I differ from him in this; for the danger which he endeavours to avert by repeated venesections — and by them chiefly, if not solely — may be more certainly and safely prevented by the means about to be noticed, when prescribed after more moderate or less frequent depletions than he recommends. Besides, internal carditis sometimes occurs in cases where bloodletting had been previously and even copiously practised; as well as in others where it must be very cautiously and moderately resorted to. In all the forms of carditis, and particularly in pericarditis, it is often necessary to repeat the venesection oftener than once; but as often, after one moderate or copious venesection, cupping will be the best mode of abstracting blood. Indeed, a sufficient quantity may be taken away by this mode from the first, if the operation be properly performed. When the symptoms are severe, and the disease fully developed, the depletion should be prompt, copious, and repeated according to circumstances; but care ought to be taken not to defer the repetition of it until the recurring inflammation proceeds far: the least indication of unsubdued action, or the earliest sign of a return of the disease, requires that this means should be again cautiously resorted to, aided, however, by the remedies about to be noticed. In the circumstances under consideration, nervous excitement, or irritation, may be mistaken for unsubdued inflammatory action. This may become a dangerous, if not a fatal error; and acute observation and enlightened experience can alone guard against it.

142. C. After bloodletting, the rapid induction of the *mercurial action* is of the greatest importance. With this intention *calomel* should be given, every four or six hours, with *opium* and small doses of *tartarised antimony*, or James's powder, or with *colchicum* or *digitalis*. These medicines act beneficially, not only by abating the morbid action of the heart, but also by in-

ducing more rapidly the specific effects of the mercury. In the rheumatic forms of carditis, colchicum is extremely useful. It may be prescribed either with calomel, or with saline medicines, especially the alkaline carbonates. I agree with Dr. Roots in his recommendation, that patients should be kept long under the mercurial influence; and that a local depletion should be resorted to, whenever the symptoms become aggravated. When palpitations or nervous symptoms follow depletions and the production of the mercurial action, *camphor* (F. 373. 375. 555.), or *assafoetida* (F. 905.), or the decoction of *senega* (F. 74.), in moderate doses, will be found extremely useful in reducing the irregularity and the frequency of the heart's action. If the irritability of the heart still continue, these medicines may be given with *digitalis* (F. 574.), or with *hyoscyamus* (F. 460.), or with *opium* (F. 493.), or with the muriate or acetate of morphia (F. 537.), or with the *hydrocyanic acid*. This last has been strongly recommended by Dr. ELLIOTSON in such cases; and I have found it extremely useful. The extract or tincture of *hop*, either alone or conjoined with camphor, or with *assafoetida*, or with the compound galbanum pill, will also be found of service. Where it is still necessary to keep up the mercurial influence, the blue pill may be added to either of these. Anodyne *plasters* (F. 108. 117.) may also be applied over the sternum: those containing camphor and extract of *belladonna* (F. 112, 113.) will be found most beneficial. Anodyne *liniments* (F. 297. 313.) will likewise be useful, particularly when pain or irritability continues after the mercurial action is induced.

143. *D.* In the more *chronic* or *sub-acute* states of inflammation of either of the constituent tissues of the heart, the means already recommended should be prescribed according to the severity and peculiarities of the case. If effusion have taken place into the pericardium, or if excrescences, or other alterations, about the valves or orifices be presumed to exist, external derivatives, by *blisters*, repeated or kept open; by *moxas*, *setons*, or *issues*; by the tartarised *antimonial ointment*, or by *croton oil*, may be tried. These derivatives are most serviceable when directed to a part at a little distance from the region of the heart. The præcordia will thus remain free for the application of either of the plasters, or of the liniments recommended above (§ 142.), or of mercurial ointment with camphor. When, in these states of carditis, the action of the heart becomes inordinate, M. BOUILLAUD and some French physicians advise eight or ten grains of powdered *digitalis* to be sprinkled over the blistered surface. I have had no experience of this mode of employing *digitalis*. When, in addition to the irregular and excited action, there is more or less pain—a perverted state of sensibility following the morbid vascular action—ointments or embrocations containing the *narcotic alkaloids*, especially *veratria*, *delphinæa*, or *aconitine*, may be then tried, in the manner advised by Dr. TURNBULL. I have prescribed the first of these substances, in two or three cases of this kind; but, although it was not devoid of a certain degree of efficacy, it was not so beneficial as was anticipated from the praises bestowed upon it. In neuralgic affection of the heart, and in

angina pectoris, the external use of these substances is sometimes productive of relief.*

144. *E.* When the inflammatory affections of the heart are *connected with arthritic or acute rheumatism*—in these especially, but also in other cases of carditis—a superabundance of fibrine or of albumen in the blood should be expected, and the disposition to its coagulation on the inflamed surface ought to be prevented as much as possible. The only means which I know, capable of fulfilling this intention, are—mercurials combined as above advised, particularly with colchicum or antimony; the spirits of turpentine given in drachm doses three times a day, until the kidneys become affected; the subborate or the subcarbonate of soda or of the other alkalies; and the hydriodate of potash. These, after vascular depletion has been employed sufficiently, will often be of service, especially if they be judiciously combined with sedatives or narcotics, and aided by external derivatives; substances of an acid nature being at the same time avoided. Bloodletting will rarely of itself remove altogether this or any other form of carditis, or change the morbid state of the blood, unless it be assisted by other means, more especially by those already mentioned.

145. *F.* When either of the forms of carditis supervenes in the course of *eruptive* or *continued fevers*, after having a cautious recourse to general or local depletion, the milder preparations of mercury in frequent doses until the mouth becomes affected, the alkaline subcarbonates, spirits of turpentine internally, or externally in the form of stupe or embrocation, mercurial liniments or ointments with camphor, &c., and external derivatives, are most to be depended upon. The action of the kidneys should also be promoted by conjoining these with anodynes, nitre, or the sweet spirits of nitre, *digitalis*, camphor, opium, &c., according to the peculiarities of the case; or by assiduously rubbing a stimulating *liniment* (F. 297. 311.) over the loins. If the inflammation affect chiefly the internal membrane of the heart, in the course of exanthematous or low fevers, or if it seem to have been induced by morbid or irritating matters in the circulation, vascular depletions must be employed with caution; in the latter of these circumstances, they will often be more injurious than beneficial. The other means, however, just recommended, particularly camphor, nitre, the alkaline subcarbonates, and opium, should not be neglected.

146. *G.* *Relapses* of carditis, especially of pericarditis, are very common, particularly when the

* Dr. TURNBULL prescribes *veratria* and *delphinæa* in similar formulæ and in the same doses. He directs half a drachm of the alkaloid to be dissolved in a drachm of sweet oil, and made into an *ointment* with an ounce of prepared lard;—or a scruple of the alkaloid to be dissolved in two ounces of rectified spirit, for an *embrocation*;—or one grain in twelve pills, with extract of *hyoscyamus*, &c., one of which is to be taken every three hours. A small portion of the ointment, or of the embrocation, is to be rubbed over the præcordia, for ten or fifteen minutes, twice a day. He prescribes *aconitine* in similar formulæ to the foregoing; but he directs only sixteen grains, and eight grains of it, to the same quantity of ointment and spirit respectively.—Of the tincture of aconite (prepared from one pound of coarsely powdered aconite root macerated in two pounds of rectified spirit for seven days), he gives four or five drops three times a day; and employs it also externally.

patient relinquishes medical and moral treatment, before the morbid condition is entirely removed and the functions of the organ entirely restored, or when the inflammation has left more or less alteration of structure, or when the mercurial influence has been imperfect, of too short duration, or suddenly terminated. This influence should therefore be exerted fully, continued for some time—not less than two or three weeks—and allowed gradually to subside. In cases of relapse, the large depletions, often required in a first attack, are frequently hazardous. Local bleedings and a moderate use of mercury are generally sufficient. Relapses are usually of a sub-acute or chronic form, and are often merely exacerbations of unsubdued disorder, or inflammatory action superinduced in parts already altered in structure as well as impaired in function. Hence these remedies should be prescribed with more precaution and restriction than in first attacks.

147. External derivatives employed so as to produce a permanent effect, are usually of service in relapses, as in the chronic states of the disease. Blisters should be repeated, or kept open; but they should not be applied immediately over or too near the heart, nor longer than to produce redness or incipient vesication. The part ought then to be covered by a warm bread-and-water poultice, which ought to be several times renewed. The irritating effects produced on the circulation by the absorption of the cantharides will thus be in some measure prevented. Other means of derivation are often preferable to blisters, especially tartarised antimonial ointments or plasters; or warm turpentine stupes, embrocations, or liniments; but the former of these, as well as setons and issues, should be directed at some distance from the inflamed organ. If these occasion constitutional irritation or debility, they should be relinquished; or anodynes may be given with gentle tonics, as the tincture or extract of hop with camphor or assafoetida, or the medicines of this kind already advised (§ 142.), may be prescribed, in combinations according to circumstances.—The diet should be light and moderately nutritious.

148. *H.* In the different states of carditis, the bowels must be kept moderately open by *mild* and *cooling purgatives*, but severe purging ought to be avoided. The functions of the other excreting organs should also be promoted. The urine especially ought to receive attention, both as to quantity and quality. If it abound with acid, as generally observed in the rheumatic complications, the alkalies, or the subborate of soda, may be given in large doses, with colchicum, camphor, digitalis, or hyoscyamus, &c. The states of the stomach and liver require careful regulation; and the redundancy of excrementitious matters in the blood must be prevented by promoting the free action of all the emunctories.

149. *I.* The diet and regimen should be strictly antiphlogistic in the more acute states of the disease. As these pass away, or lapse into more chronic forms, bland, mucilaginous or farinaceous articles of food, according to the circumstances of the case, may be allowed; but even these ought to be given sparingly until convalescence is established. In the more chronic cases, or after relapses, the diet may be more nutritious, light animal food and broths being allowed in

moderate quantity. Still the principal part of the diet ought to be chiefly farinaceous; and all exciting or heating beverages must be avoided. During the different forms and complications of carditis, perfect repose, mental and physical, ought to be preserved. The patient's *drink*, in acute or first attacks especially, should be emollient and cooling. A weak decoction of marsh mallows, or of barley, or of liquorice root, or mucilaginous fluids containing small quantities of the nitrate of potash, and the subcarbonate of soda, or the subborate of soda, will be found generally appropriate. Beverages containing an acid should be avoided.

150. *X.* OF INFLAMMATIONS OF THE HEART IN CHILDREN.—*A.* *Internal Carditis* is sometimes met with in *children*—most frequently after small-pox, scarlatina, pneumonia, whooping-cough, and measles: but it occasionally also appears as a primary affection. It is often connected with articular rheumatism, or complicated with pneumonia or pertussis. I have observed it to attend, in its more acute states, the secondary fever of small-pox, but it more commonly appears during convalescence from these eruptive diseases. It is generally insidious in its attack and early progress. The pulse becomes quick, irritable, small, and irregular. Cough, without expectoration, or increase of pain, is sometimes present. The sounds of the heart are extended, and the pulsations are indistinct or tumultuous, or run into one another. Breathing is short or hurried, especially on any exertion. A heavy pain or aching, or soreness is felt under the sternum, and to the left side. The jugular veins often pulsate; the face is anxious; the hands become hot in the evening, and the child cannot preserve the horizontal posture in bed. Still it walks about, appears only much out of health, is short-breathed, irritable, and very delicate. On auscultation, a blowing or bellows sound is generally heard more or less distinctly. At last hypertrophy, with dilatation of the heart, becomes manifest, and all its consequences.

151. *B.* *Pericarditis* is a much more common disease in children than is generally supposed. I have met with it often, both in its simple and complicated forms; and at all the epochs of childhood—from three or four years and upwards. It is frequently associated with endocarditis, and true carditis, and with pleuritis or pleuro-pneumony. In the latter complications, it often proceeds to a fatal issue, without having been recognised during life, it having been masked with the pulmonary affection. Most commonly, however, it is connected with acute arthritic rheumatism; and in this case there may exist also internal carditis, and diaphragmatic or pulmonary pleuritis.

152. *C.* The *Causes* of pericarditis in children, are nearly the same as in adults. I have observed the disease chiefly in children who live in low cellars, and in ground floors, and are much exposed to cold and humidity, especially if they be imperfectly clothed, and ill-fed. It is from these causes principally that articular rheumatism, with which the different forms of carditis are generally associated in children, also arises. Pericarditis is often occasioned by exanthematous fevers, and by inflammations of the lungs or pleura; or it follows these diseases, most pro-

bably, in consequence of exposure to cold, or to vicissitudes of temperature during convalescence from them. It is extremely rare to meet with articular rheumatism in persons under puberty, and especially in children, unconnected with external or internal carditis, or even with both. The *Symptoms* of pericarditis in children, and the structural lesions produced by it, as well as those consequent upon endocarditis, differ in no respect from the history given of them in adults.

153. *D.* The Treatment of inflammation of the heart in children should be strictly and actively antiphlogistic, at an early stage. Decided local depletions, the exhibition of calomel or other mercurials with colchicum, or antimonials, or other anodynes; mild purgatives, external derivatives, perfect repose, and a bland low diet, with the emollient and alkaline drinks already prescribed; are the chief means of cure.*

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* On referring to my note-book, for cases of pericarditis in children, I find that, in those from five to seven years of age, the following was the treatment most commonly prescribed. All these cases were connected with articular rheumatism. — After cupping or applying leeches over the sternum, according to the age and strength of the child, a powder, consisting of three grains of calomel, and one of James's powder, was directed to be taken three times a day, and continued till the gums were affected. This mixture was also prescribed, and the effects of both carefully observed: —

No. 252. — R. Mist. Camphoræ ʒ iij.; Liq. Ammon. Acet. ʒj.; Vin. Antimonii Tart. 3 ss.; Tinct. Sem. Colchici ℥ xxv.—xxx.; Syrup. Tolutan. ʒj. M. Fiat Mist., cujus capiat Coch. ij. minima, tertiâ vel quartâ quaque hora.

Blisters were generally directed to the right side of the chest, with the precautions above enforced (§ 147.); and where there appeared a tendency to effusion into the pericardium, the following was sometimes directed: —

No. 253. — R. Mist. Camphoræ, Aq. Fœniculi, aa ʒjss.; Liq. Ammoniac Acetatis ʒj.; Potassæ Acetatis ʒijss.; Spirit. Æther. Nit. ʒj.; Tinct. Digitalis ℥ xxv.; Tinct. Scillæ 3 ss. M. Fiat Mist., cujus capiat Coch. i. medium, quartis horis.

If the internal surface of the heart seemed to be inflamed, after the remedies already noticed, the following was often employed: —

No. 254. — Mist. Camphoræ ʒ ivss.; Potassæ Nitratis ʒ ij.; Sodæ Sub-carbon. ʒj. (vel Sodæ Sub-boratis 3 ss.); Spirit. Ætheris Nit. ʒjss.; Tinct. Digitalis ℥ xx.—xxx.; Syrup. Papaveris ʒj. M. Fiat Mist., cujus capiat Coch. ij. minima, vel j. medium, quater in die.

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V.—OF STRUCTURAL LESIONS OF THE HEART AND PERICARDIUM.

CLASSIF.—IV. CLASS, II. ORDER (*Author, in Preface*).

154. DEFIN.—*Alterations of one or more of the constituent tissues or compartments of the heart, generally arising from previous local or constitutional disease, and occasioning more or less obvious lesions of related organs.*

155. This class of diseases of the heart might, according to the definition just given, have comprised several alterations of structure which have been already considered. But, as these alterations more immediately proceed from inflammatory action, they have been noticed under the head of inflammations of this organ. The lesions, however, which remain to be described, do not depend alone upon either of the chief pathological states already discussed. They are no more the consequences of inflammation, than they are of altered nervous power. Indeed, they may even occur without any evidence of either morbid condition having existed, although they often more remotely result from certain combinations

or forms of these conditions. The only inference that can be drawn from a minute examination of a large proportion of them is, that the organic nervous influence, and, consequently, that the states of vascular action and of the circulating fluids, have been altered in such a manner as to have affected the nutrition of one or more of the constituent structures of the heart, or to have given rise to preternatural and adventitious productions in that organ. (See art. DISEASE, § 93. et seq.) In the consideration of the structural lesions of the heart, I shall notice, in the first place, those which seem to be the simplest in their nature, and in respect of the morbid conditions out of which they arise; and subsequently those which depend upon more complicated pathological states.

i. HYPERTROPHY OF THE HEART.—Increase of the Muscular Tissue of the Heart.

156. DEFIN.—*Augmentation of the muscular substance of the organ, resulting from increased nutrition, and this from excited action.*

157. A. Description.—Although DIEMERBROECK, BARTHOLIN, LANCISI, MORGAGNI, SENAC, BORSIERI, CORVISART, and others, had described, more or less fully, hypertrophy with dilatation, and had even noticed the simple form of hypertrophy, or that without dilatation, yet it was not until 1811 that the different varieties of the lesion under consideration were fully investigated. In that year M. BERTIN described the several forms of hypertrophy with an accuracy fully confirmed by the subsequent researches of LAENNEC, ELIOTSON, HOPE, and BOUILLAUD.—M. BERTIN considered hypertrophy nearly as follows:—1st, *Simple hypertrophy*; the parietes of the compartments being thickened, the cavities retaining their natural dimensions;—2d, *Hypertrophy with dilatation*; the cavities being increased in capacity, and their parietes either of natural or of augmented thickness; the *Active Aneurism* of CORVISART, and the *Excentric, or Aneurismal Hypertrophy* of BERTIN;—3d, *Hypertrophy with diminution of the cavities*; the *Concentric Hypertrophy* of BERTIN.

158. The second of these, or *hypertrophy with dilatation*, is the most common. It presents two varieties:—(a) That in which the walls of one or more compartments are thickened, and the cavity dilated;—(b) That with the walls of natural thickness and the cavity dilated, or *hypertrophy with increased extent of the walls* (HOPE). In this latter variety there must necessarily be augmentation of the muscular structure, otherwise the dilatation would be attended by thinning of the parietes.—The third of the above forms of hypertrophy is the next in frequency; and the first is the least common. For twenty cases of the second form of this lesion, not more than one is observed of the first. A thick parietes and a small cavity of either of the ventricles do not of themselves constitute concentric hypertrophy; for a violent contraction at the time of death may have produced this state. But in this case the bulk of the part would be proportionately lessened. To constitute, therefore, this form of hypertrophy, the parietes should not only be thickened, and the cavity be diminished, but the bulk should either be natural, or greater than natural. In this and the simple hypertrophy of the left ventricle, the thickness is sometimes

double, or even triple, what is natural. BOUILLAUD thinks that the concentric hypertrophy is more frequent and greater in the right than in the left ventricle; and adduces a case from BERTIN, where the parietes of the right ventricle were increased to sixteen lines; a thickness never observed in concentric hypertrophy of the left, although a less degree of thickening is oftener observed in the latter.

159. M. BOUILLAUD adduces several instances of hypertrophy with extreme *dilatation*. In one, the left ventricle could contain the closed hand. In another, the right ventricle could admit a goose's egg; whilst the left could contain the closed hand of a female. In a third, the right auricle of a child of seven years was filled with a coagulum as large as the hand of an adult. In concentric hypertrophy, the cavities of the ventricles, especially of the right, may be *diminished* so as hardly to admit the thumb, or a pigeon's egg. LOUIS and BOUILLAUD have observed the cavity of the right ventricle even less than this. The columnæ carneæ generally participate in this form of hypertrophy, and thereby tend to diminish the cavity. In this ventricle especially, they are often remarkably thickened and interlaced; and they may even subdivide the cavity, or traverse it, or be so hypertrophied as nearly to fill it (BERTIN, BOUILLAUD, and HOPE).

160. Hypertrophy may be limited to a single compartment, or it may extend to two or more; and even, although rarely, to the whole organ. It is, in all its forms, more frequently observed in the ventricles than in the auricles, as the former are most obnoxious to the exciting causes (§ 165.). In some instances, one cavity is thickened, whilst another is attenuated. When hypertrophy with dilatation extends to all the compartments, the heart is often enlarged to three or four times its natural size. It then usually assumes a globular form, the apex being nearly effaced; and it lies transversely in the thorax, the diaphragm turning it in this position, and considerably to the left. It also rises high in the chest, and pushes up, and presses upon, the lung of the left side. The situation of the greatest thickening is usually above the middle of the ventricles, where the fleshy columns take their origin; but an irregular form of hypertrophy is occasionally seen. The interventricular septum is not so often thickened as the external parietes.—Hypertrophy may be confined not only to a single ventricle, but even to a part of it, as the base, the apex, the fleshy columns, or the external walls; the rest of the compartments being either natural or thinned. A ventricle may also be contracted in one part, and dilated in another; but these latter alterations are comparatively rare. It is obvious that the heart will vary in its external form, according as the hypertrophy is confined to one compartment, or is extended to two or more, or as either form of this lesion predominates. When there is great dilatation, the fleshy columns are often stretched, flattened, or attenuated.

161. Hypertrophy of the auricles is generally attended by dilatation, the simple and concentric forms being very rarely observed in them—so rarely that LAENNEC does not appear to have met with these forms in this situation. The muscoli pectinati are more enlarged than any other parts of the parietes of the auricles; and sometimes they alone

are hypertrophied. Dr. HOPE remarks, that as the muscoli pectinati are larger and more numerous in the right than in the left auricle, it is in the former that the thickening proceeds to the greatest extent; the right auricle being thereby rendered nearly as thick as the right ventricle (§ 9.).

162. *B. The Nature and Causes of Hypertrophy.*—The hypertrophied muscular tissue of the heart is generally of a livelier red hue than the natural structure, and at the same time firmer and more elastic. This circumstance, in connection with that of hypertrophy sometimes following inflammation of the external and internal membranes, and being even occasionally associated with inflammation of the internal surface of the aorta, has induced some pathologists—especially BERTIN, BOUILLAUD, ANDRAL, and ELLIOTSON—to refer this lesion to inflammatory action; and they have considered the accompanying pain and sense of heat in the cardiac region occasionally complained of, the absence of any obstacle to the circulation in some cases, and the not infrequent complication of it with more or less recent inflammatory products on one or other of the surfaces, or with increased vascular injection, as proofs of this origin. M. BERTIN quotes, in support of this view, the experiments of M. CHEVALIER, who found, on comparing an hypertrophied ventricle with a healthy specimen, under the microscope, that the fibres of the former were much redder than those of the latter; and that, on steeping a portion of each in separate quantities of distilled water, the hypertrophied portion reddened the water more than the other, and when taken out was still the redder of the two. On being put in boiling alcohol, it was found to contain less fatty matter. On this point, which is one of some importance as regards the treatment, the writers just named contend that, although it may be considered that this lesion is most frequently produced by obstruction in the opening leading from the hypertrophied cavity, and depends upon increased muscular efforts to carry on the circulation through it, occasioning an increased circulation in the nutrient vessels, and hence augmented nutrition of the part; and although this undoubtedly obtains to a great extent, and amounts very nearly to one form of inflammation—to inflammation with a development of the formative process; yet hypertrophy does not always depend upon such obstruction; and even when it does, it may be considered not the less inflammatory, inasmuch as the obstruction, whether in the valves or in the state of the orifices, is almost always a result of, or an attendant upon, inflammation; the obstruction, as well as the hypertrophy, proceeding from the presence or continuance of increased vascular action, especially of the nutrient vessels.

163. Notwithstanding these arguments, hypertrophy of the muscular tissue does not appear to be the immediate result of inflammatory action, although it is generally consequent upon the changes produced by this state of action, and is often associated with it in the other constituent tissues of the heart. Indeed, it is not unusual for inflammation to occur in these tissues in the course of hypertrophy. Admitting that the obstruction to the circulation, productive of enlargement of one or more of the compartments, is not

always seated at their openings, yet the inordinate action either caused by nervous excitement long continued and by inflammatory irritation of the internal membrane, or required to overcome the impediments occasioned by false membranes and by adhesions of the pericardium, may so develop the muscular structure of a part, or the whole of the organ, as to constitute a very remarkable degree of hypertrophy, although the orifices are unobstructed. If the opinion I have contended for above (§ 6.), — that the heart possesses a power of active dilatation, as well as of active contraction, — be admitted, the circumstance of causes which impede the dilatation of one or more of the cavities being attended by hypertrophy will be readily explained; and one of the arguments in favour of the opposite doctrine disposed of. When this lesion is seated in the ventricles, especially in the right, it is occasioned, perhaps, as frequently by these causes, as by any obstacle to the onward current of the circulation. The increased firmness and elasticity of the hypertrophied structure is an additional evidence that this lesion is not in itself inflammatory; for it presents neither the friability and softening, nor the induration and morbid colour, observed to follow inflammation.

164. Viewing, therefore, hypertrophy of the heart as the result of augmented nutrition consequent upon increased exercise of the muscular structure, the increased exertion requiring, and hence inducing, a more active state of the circulation in this structure, it follows, that whatever occasions this increase will, if long continued, give rise to this lesion, in some one or other of its forms, especially in young, sanguine, or plethoric persons, or whilst the powers of life are unimpaired. Whatever excites the nervous influence of the heart, so as to produce long-continued palpitation, or demands from the organ a greater power, either of contraction or of dilatation, will produce it, particularly in the compartments having a more direct relation to such exciting cause. The more *remote causes*, therefore, of hypertrophy may be divided into — 1st. Those which act directly upon the nervous influence of the heart; — 2d. Those which impede the onward current of the blood, and thereby occasion reaction of the muscular structure, in order to overcome the distending or opposing fluid; — and, 3d. Those which encumber the muscular actions of the organ, and render either the contractions or the dilatations of its cavities more difficult, and require a more energetic exertion of these actions, than natural. It must not, however, be supposed, that the causes belonging to either of these orders produce the effect singly. Two or more of them, although belonging to different orders, often act in unison in producing this lesion.

165. *a.* The *exciting causes* which act primarily upon the nervous influence of the organ are — all the moral emotions, the other causes shown above to produce palpitation (§ 45, 46.), and the physical agents which occasion increased circulation. Protracted muscular exertion, by returning the blood to the heart with great rapidity or force; a stimulating and rich diet, by exciting the heart, and at the same time loading it with a rich blood; and the abuse of spirituous and intoxicating liquors; are often more or less directly concerned in the pro-

duction of this lesion, although other causes frequently co-operate with them. — *b.* The causes which produce reaction by obstructing the circulation are chiefly mechanical, as the alterations in the orifices and valves already described (§ 66, 67.); contractions, dilatations, and aneurisms at the commencement of the arterial trunks — especially the aorta; congestion of the lungs, or interrupted circulation through them, from disease of their substance, or of the bronchial tubes, or of the pleura, or from emphysema, and from the accumulation of fluids in the pleural cavities; the frequent recurrence of spasmodic and convulsive affections, particularly asthma and hooping cough; and whatever impedes the circulation in the aorta, vena cava, and principal vessels immediately connected with them, as wearing strait corsets, the gravid uterus, and large tumours. Under this head, also, may be mentioned, insufficiency of auriculo-ventricular valves, either from atrophy or contraction of them, or from dilatation of the orifices. Contractions of these orifices, or obstructions caused by adhesions of, or excrescences upon, the valves, will occasion hypertrophy not only of the auricles, but also of the ventricles — of the auricles, from the obstruction at their outlets, and the consequent distension of their cavities; of the ventricles, from the augmented force of dilatation required to fill them; the concentric form of hypertrophy depending chiefly upon this latter cause. — Of the other causes of hypertrophy it is unnecessary to make particular mention, as they are of less frequent occurrence, and do not differ materially from those already noticed in connection with excited action (§ 19. 45.) and inflammations (§ 126.) of the heart.

166. It may be stated in general terms, that the same causes and lesions of structure which occasion *thickening* of the parietes of a compartment, or thickening with dilatation, will produce in other persons simple *dilatation*, or dilatation with *attenuation* of the parietes. The alterations of the thickness of the walls, as well as of the capacities of the cavities, seem to depend very much upon the states of vital energy and resistance, and of nutrition. In young and robust persons, thickening of the walls, with or without dilatation of the cavities, of one or more of the compartments will most likely occur; whereas in the delicate, the lymphatic, or leucophlegmatic, in the ill-fed, and in those either advanced in life, or exhausted by previous disease, dilatation, or dilatation with attenuation of the parietes, of one or more of the chambers, will most probably take place; but much also will depend upon the nature of the obstruction or cause out of which the hypertrophy or dilatation arises. Where the obstruction to be overcome is relatively greater than the power of the organ to overcome it, dilatation of the cavity more frequently takes place, than thickening of the walls of that cavity; and where the obstruction is *before* the hypertrophied cavity, more or less dilatation is usually observed; the degree of thickening or of attenuation of the parietes depending upon the states of vital power and of nutrition as just stated. Where, however, the obstruction is *behind* the hypertrophied compartment, thickening of its walls, with or without diminution of its cavity, is the common attendant.

—When the cause of hypertrophy is regurgitation of blood into the cavity, owing to insufficiency of the valves at the outlet, there is generally more or less dilatation; but there may be either thickening or attenuation of the walls, according to the states of vital energy and nutrition. — Where there is actual thickening of the muscular substance, the coronary arteries are found proportionally enlarged, indicating a greater activity of the vital and nutritive actions of the organ. — Dr. HOPE considers, that, when hypertrophy is connected with an obstruction *behind* it, the alteration is owing to the retarded circulation in the veins which is propagated through the capillaries to the arterial system, and ultimately to the heart. He thus explains the occurrence of hypertrophy of the left ventricle, when the mitral orifice is contracted. But the active efforts made to fill the ventricle seem to me to be the cause of this association of hypertrophy (§ 165.); for it is often observed, where the extreme venous congestions to which Dr. HOPE's mode of accounting for it would necessarily give rise, are not met with.

167. *C. The Complications of Hypertrophy of the Heart* are principally those morbid conditions, of which the enlargement is a frequent consequence, particularly those just mentioned (§ 165.), and chronic inflammations of the internal and external surfaces of the organ. These latter lesions, as well as disease of the orifices and valves, not only give rise to hypertrophy, but also often complicate it during its future course. When inflammatory irritation is induced in the internal membrane of the cavities, excited action of the muscular structure is the usual consequence; and when this is long kept up, hypertrophy will follow to a greater or less extent. When pericarditis is followed by adhesions or by false membranes, thickening of the walls of the compartments will also sometimes result. The increased action required, in this encumbered state of the organ, in order to keep up the circulation, developing and augmenting the muscular structure of one or more of the compartments. In these cases, additional lesions are often observed, particularly of the valves and orifices; and adhesions of the pericardium to the pleura, or other alterations of the collatitious viscera, frequently also exist.

168. Nothing is so common as to find one or more of the above changes of the internal and external surfaces of the heart complicated with hypertrophy. M. BOUILLAUD remarks, that, when inflammation of the external, and especially of the internal, sero-fibrous tissue of the organ has become chronic, hypertrophy of the muscular structure is sure to follow. Of thirty-three cases, which he records, of pericarditis and endocarditis that terminated in thickening and induration, there was not one in which there was not also hypertrophy. Indeed, this latter lesion may be associated with any of the alterations to which the pericardium and heart are liable, or even with several of them; and it may be, moreover, complicated with various changes of the arterial system, especially cartilaginous, osseous, and albuminous productions (see arts. APOPLEXY, § 96.; and ARTERIES, § 38. *et seq.*), aneurisms, &c.; or with congestions of related organs, particularly of the lungs, the brain, and

the liver; or with effusion of serum into shut cavities, or into the cellular tissue; or with hæmorrhages from mucous surfaces, or into the substance of the larger organs, as the brain, lungs, liver, &c.

169. *D. Of the Influence of Hypertrophy, &c. of the Heart upon Cerebral and Pulmonary Hæmorrhage.*—It is unnecessary to add much to the remarks already offered on this subject, in the articles APOPLEXY (§ 96.), and HÆMORRHAGE with it require to be considered at this place.—*a.* (§ 30. 107. 115.); but certain points connected *Cerebral hæmorrhage* is probably a more frequent consequence of cardiac disease, than pulmonary hæmorrhage, but facts are wanting to determine to what extent it is so. That it is more common is shown by BERTIN and BOUILLAUD; and it may partly be accounted for by the fact of disease of the pulmonary arteries being much less common than alterations of the cerebral vessels. That an intimate connection often exists between the occurrence of apoplexy and palsy, and antecedent disease of the heart, is now fully established, although doubts are still entertained by some as to the nature of the connection. As long ago as 1822, and 1823, I discussed this question (*Lond. Med. Repos.* vols. xviii. p. 149., and xix. p. 17.), and in the article APOPLEXY (published Sept. 1832), the results of my inquiries were again stated. The occasional dependence of cerebral hæmorrhage on disease of the heart was first remarked by BAGLIVI, who observed it in the case of MALPIGHI, who died apoplectic after palpitations caused by structural change of the heart. It was only incidentally mentioned by MORGAGNI and LIEUTAUD; and not insisted on in the relation of cause or effect, until M. RICHERAND treated of it in his account of the case of CABANIS, in whom this complication was found. PORTAL, TESTA, and SPRENGEL soon afterwards expressed the same opinions as RICHERAND; and ROSSI met with this association of disease in the case of the Crown Prince of Sweden. The frequent connection between cerebral hæmorrhage and disease of the heart has been shown, in this country, by HUTCHINSON, ABERCROMBIE, CRAIGIE, JOHNSON, HOPE, WATSON, and myself; and in France, by BRICHETEAU, LALLEMAND, BERTIN, CRUVEILHIER, BROUSSAIS, ANDRAL, and BOUILLAUD; and the effect upon the brain has been too exclusively limited to hæmorrhage, and too generally imputed to hypertrophy of the left ventricle. There is, however, every reason to believe that softening of the brain, congestions of the veins and sinuses, and serous effusions into the ventricles or between the membranes, occasionally also proceed from cardiac disease, especially when it causes obstructed circulation through the right side of the heart; and that cerebral hæmorrhage may sometimes depend upon the lesions in this situation, as suggested in the articles referred to.

170. M. BRICHETEAU has very recently investigated this subject at some length; but he has insisted chiefly upon the influence of hypertrophy of the left ventricle in the production of hæmorrhage in the brain. He has, however, remarked, that other changes within the head besides this may result from this cause, especially determination of blood to the brain, mental disorder, serous effusion, brain fevers, &c. He observes, that when hypertrophy is accompanied with other

lesions of the heart, particularly with such as impede the free egress of the blood from the left ventricle, as disease of the aortic orifice, the symptoms of cerebral disorder are then much less conspicuous; and that dyspnœa, tendency to syncope, and dropsical effusions, are more marked. — M. BOVILLAUD found, out of fifty-four cases of hypertrophy, in some of which the right ventricle only was affected, and the left one not at all, or very little so, that there were eleven with cerebral disease, six with apoplexy, and five with softening of the brain. In five of these eleven, the cerebral arteries were ossified or cretaceous at one or more points. In six of these cases, the hypertrophy of the left ventricle was *excentric*, in three it was *concentric*, and in two *simple*.

171. Dr. WATSON (*Lond. Med. Gaz.* April 6. 1835.) has made some very judicious remarks upon this subject; but in all the material points, particularly in the explanation of the connection between diseases of the heart and brain, he has been anticipated by the observations I have offered both in the papers referred to above, and in the article APOPLEXY (§ 96.), where I have succinctly given the results of my own investigations. The views there entertained, as Dr. J. JOHNSON has done me the justice of stating (*Med. Chirurg. Review*, April, 1836, p. 512.), in an able inquiry into this subject, are fully confirmed by his own experience, and by the more recently published researches of MM. BOVILLAUD, BRICHETEAU, and others. — As the paragraph referred to in the article APOPLEXY has so fully and completely anticipated the results, at which subsequent writers on this subject have arrived, I have only to request the reader to turn to it, especially as I have nothing further to add to it.

172. *b. The influence of cardiac disease on pulmonary hæmorrhage* has also been adverted to in the article HÆMORRHAGE (§ 30. 115.), M. BOVILLAUD found this form of hæmorrhage less frequently to arise from lesions of the heart, than that just noticed. He has adduced only three instances in which it seemed to depend upon hypertrophy of the right ventricle. And M. BERTIN, whilst he admits the occasional connection between pulmonary apoplexy and hypertrophy in this situation, considers it not common. A more intimate and more frequent dependence of the former on the latter has recently been contended for by M. BRICHETEAU. A different view of the connection between pulmonary hæmorrhage and cardiac disease has been lately entertained by Dr. WILSON and Dr. WATSON, particularly the latter. The dependence of dropsical effusions within the chest upon organic lesions in the left side of the heart, has been long known; but the connection between hæmorrhage from the respiratory surfaces, and these lesions, had been entirely overlooked. Mr. A. BURNS seems to have been the first who took a judicious view of the subject. He observes, that the pulmonic vessels, by the congestion occasioned by cardiac disease, and the continued *vis à tergo*, are ruptured; the blood being forced into the air-cells, or into the cellular structure of the lungs, until this organ appears like liver, or sinks in water. Dr. WATSON has very fully shown that the pulmonary hæmorrhage rarely depends

upon hypertrophy of the right ventricle, but chiefly upon narrowing of the left auriculo-ventricular orifice, or rigidity of the mitral valve. Indeed, hypertrophy of the right ventricle seldom exists without disease at the origin of the pulmonary artery sufficient to counteract the increased action of the ventricle. It is, therefore, the obstructed return of blood from the lungs, and but rarely the increased impetus occasioned by the hypertrophied right ventricle, that causes any of the forms of pulmonary HÆMORRHAGE (§ 107. 115.). M. BERTIN admits the influence of narrowing of the left auriculo-ventricular orifice in the production of hæmorrhage into the lungs, and considers the hæmorrhage thus caused to be of a more gradual and passive kind, than that produced by hypertrophy of the right ventricle. Dr. TOWNSEND (*Cyclop. of Pract. Med.* vol. i. p. 138.) states, that of twenty-two cases of pulmonary apoplexy examined by him, more than two thirds occurred in persons whose hearts were diseased, and in two only of these was the hæmorrhage connected with tubercles; but he has neglected to assign the particular lesions of the heart observed in these cases. The very frequent dependence of pulmonary apoplexy on cardiac disease has been insisted upon, also, by CHOMEL, ANDRAL, CRUVEILHIER, BOVILLAUD, HOPE, and others; but with a great want of precision as respects the seat and nature of the primary malady. That cases sometimes occur, in which hypertrophy of the right ventricle is associated with narrowing of the left auriculo-ventricular orifice, in the production of pulmonary hæmorrhage, is shown by an interesting case recorded by Dr. LAW (*Cyclop. of Pract. Med.* vol. ii. p. 403.). A young lady had repeated hæmoptysis, with palpitations, which were more frequent and profuse until death. Both lungs were found engorged with blood, &c. The right ventricle was hypertrophied and dilated; the left auricle dilated and thickened; the left auriculo-ventricular orifice contracted so as hardly to admit a quill; and the left ventricle contracted. The pulmonary artery was dilated and thickened; the aorta was smaller than natural. In this case the congestion of the lungs, consequent upon obstructed circulation through the left side of the heart, had not only caused hæmorrhage, but also hypertrophy, of the right ventricle.

173. It is, moreover, very probable, as I have stated in the article HÆMORRHAGE (§ 115.), that when the more powerful moral emotions are productive of hæmoptysis, this effect is owing as often to their impeding the circulation through the *left* side of the heart, as to their exciting the action of the right ventricle; and that, when the same emotions occasion apoplexy, palsy, or any other cerebral disease, they act as frequently by interrupting the current through the *right* side, as by inducing inordinate action or hypertrophy of the left ventricle. — It is, however, to be presumed, that the opposite passions produce opposite effects upon the heart, and that, whilst terror, fear, grief, anxiety, and other depressing passions impede the circulation through this organ, and cause congestion of its cavities, thereby favouring the occurrence of hæmorrhagic or serous effusions, either in the head or in the chest, the exciting passions, as anger, desire, revenge, &c., accelerate and increase the force of the circu-

lation, by exciting the actions of the ventricles. From this it will appear, that the same class of emotions may induce effusion into either the brain or lungs, according to the predisposition or previous state, functional or structural, of these organs, and to the side of the heart chiefly affected by them; and that, whilst the depressing passions act by interrupting the circulation through the heart, and consequently by impeding the return of blood from these parts, the exciting emotions operate by increasing the frequency and power of the ventricular contractions, and by propelling the blood with greater force into these organs.

170. *E. Symptoms and Diagnosis of Hypertrophy of the Heart.* — *a. The local signs* consist chiefly of a permanent increase of the force of the heart's contractions, of the sphere within which they are perceived, and of the double sounds attending them. These signs — the permanently increased force, extent, and sounds of the heart's actions — are always present; but they vary considerably, and are attended by other phenomena — commonly by an increased extent of dulness on percussion in the cardiac region, and often by some degree of prominence of this part, particularly in young persons. — Where hypertrophy is considerable, the movements of the heart are visible in a large extent of the left side of the chest, and towards the pit of the stomach, and often through the clothes. The apex of the heart is felt more to the left, and generally at the sixth, seventh, or eighth intercostal space, whilst the base corresponds with the third, or even the second intercostal space. — On applying the hand upon the cardiac region, a stronger, a more extensive, and longer enduring impulse or shock is felt, consisting not only in the striking of the apex, but also in the pushing of the ventricle against the ribs, as the latter swells in each contraction. In these cases, the head, or stethoscope, on auscultation, is raised by the force of the impulse. The first sound is generally prolonged and duller than natural; and the more so, the greater the hypertrophy or thickening of the ventricle. But when the thickening is moderate, and the cavity is somewhat dilated, the sounds are stronger and clearer than natural, and heard over a more extended sphere. When the thickening is very great, and the cavity diminished, the sounds become nearly or altogether imperceptible. In simple hypertrophy, the sounds are not usually otherwise morbid; but when there is disease of the valves, then the sounds characteristic of this disease are heard.

175. In proportion as *dilatation* is great, the impulse is slighter, brisker, and lower than natural; and the first sound is louder, clearer, and of shorter duration. The greater the thickening of the walls, the duller are the sounds, compared with the force of the shock or impulse; and the greater the dilatation of the ventricular cavities, and attenuation of their parietes, the clearer, louder, and shorter are the sounds, in relation to the force of the impulse; which, in cases of great dilatation, is much less than natural. Where the enlargement consists chiefly of dilatation, as well as where thickening predominates, the sounds will be otherwise altered, according to associated disease of the valves or orifices of the organ. — In *hypertrophy* with

slight dilatation, as Dr. WILLIAMS remarks, there is a strong heaving impulse, with an abrupt collapse, or back stroke, and a prolonged, diffused, but not clear sound. — In *dilatation* with slight hypertrophy, the sound is loud, commencing abruptly, and heard over a large space; whilst the impulse is unnaturally great only when the heart is excited, as in palpitation, when it produces hard, abrupt, and circumscribed blows, without heaving. The palpitations attending hypertrophy will be violent and heaving, when the thickening predominates; but noisy, fluttering, and accompanied with a feeling of faintness, when dilatation is the chief lesion.

176. Cardiac hypertrophy is seldom accompanied with *pain*; but when it is considerable, or very great, a sensation of uneasiness, of weight, or of anxiety, is often felt in the præcordia, or at the epigastrium. *Dulness* on percussion is in relation to the extent of hypertrophy and dilatation, and is observed to extend downwards and towards the left side, owing to the explanation given above (§ 160.), unless when the heart is confined by adhesions. *Prominence* of the cardiac region is not uncommon when the hypertrophy is great. BOUVILLAUD has directed particular attention to this sign; but it has been incidentally noticed by others.

177. *b. The general or rational symptoms* vary much with the form of hypertrophy, and with the other lesions of the heart with which this is associated. — The *pulse* in simple and excentric hypertrophy is generally strong, large, full, vibrating, and free; but it is small or oppressed in the concentric variety. When there is also disease of the left orifices and valves, the pulse is weak, small, or otherwise affected. Where the hypertrophy is simple, the face and general surface are animated, the animal heat is developed, and a tendency to active hæmorrhage sometimes observed. The venous circulation is also unimpeded, and neither sanguineous nor serous congestions or effusions take place. But when the hypertrophy is complicated with lesions, interrupting the passage of the blood through the heart, the pulse is weak, small, and irregular; congestions or effusions of blood, and dropsical infiltrations and collections, being common results. — *Respiration* is but little disturbed as long as the hypertrophy is moderate and simple. But when it is excessive, it then encroaches on the lungs, and causes *dyspnœa*; and, as this state is usually a consequence of impeded passage of blood in the heart, causing congestion of the lungs, or serous infiltration of their substance, the *dyspnœa* is principally owing to these circumstances. Indeed, the majority of sympathetic phenomena, observed in connection with hypertrophy, are no further dependent upon this lesion than that they result from the same alterations as it. — *Cough* is seldom present in the early stages, especially when the hypertrophy is confined to the left ventricle; but when sanguineous or serous congestion supervenes in the lungs, this symptom is commonly observed. — *Edema* occurs when the hypertrophy is very considerable, and is attended by dilatation. It often appears first in the eyelids and face; and, as the obstruction to the circulation through the heart increases, the serous infiltration augments, and becomes more general.

—In simple hypertrophy, the *countenance* retains its complexion, or is more than usually florid; but when there is dilatation, and in proportion as the enlargement is complicated with obstructed circulation, and as the obstruction extends to the lungs, the lips, cheeks, and even the nose, present more and more of a purplish tint, and the *general surface* assumes a sallow and cachectic hue. — *Apoplectic, paralytic, or convulsive attacks*, and *pulmonary hæmorrhage*, have been already noticed as consequences of hypertrophy, particularly of its more complicated states. *Epistaxis* sometimes occurs, and prevents or defers the occurrence of either of these, or of some other serious symptomatic malady.

178. *c. The signs and symptoms of hypertrophy of the individual compartments* require some notice, those just mentioned having reference to this change of the ventricles generally. — The physical signs of hypertrophy of the auricles cannot be stated with any precision in our present knowledge; but, as this change is usually associated with hypertrophy of the ventricles, the distinction between them is not material. — *Hypertrophy of the left ventricle* may be recognised by the following signs: — The impulse of the heart is greatest under the cartilages of the fifth, sixth, seventh, and eighth left ribs; and in this situation there is the most dulness on percussion, and prominence of the thorax. The pulse, if there is no obstruction at the aortic orifice, is strong, tense, full, vibrating, or hard; the face is flushed, and the patient experiences throbbing headaches, giddiness, and sometimes even epistaxis. — *Hypertrophy of the right ventricle* is attended by a palpitation, or an impulse, which is strongest under the lower part of the sternum, where, also, is the greatest dulness on percussion, especially if this lesion be not associated with hypertrophy of the left ventricle; and the pulse possesses neither the force nor tension observed in this latter alteration. There are commonly more or less dyspnœa, short breathing, cough, and subsequently expectoration and lividity of the face; but, as I have shown above (§ 172.), these symptoms are still greater, and more frequently attended by hæmoptysis, when the lungs are congested in consequence of interrupted circulation through the left side of the heart, with which, however, this form of hypertrophy is occasionally associated. Turgescence, pulsation, or undulation of the jugular veins, was noticed, as a symptom of this alteration, by LANCISI; was rejected by CORVISART; but admitted by LAENNEC, and HOPE. BERTIN and BOUILLAUD consider that it is present chiefly in hypertrophy with dilatation, extending to the auricle, and when the right auriculo-ventricular orifice is imperfectly shut during the systole.

179. *F. Terminations and Prognosis.* — *a.* As long as hypertrophy continues simple, and moderate in degree, the patient may experience but little inconvenience from it beyond slight dyspnœa and palpitations, particularly on exertion. But if intemperate living be indulged in, or great corporeal exertion be resorted to, the disease will increase rapidly, and will lead to further change either of the heart or of the more immediately related organs, especially of the brain and lungs. The *progress* of the malady will consequently vary with the peculiarities and complications of

the case, and with the habits, occupations, and treatment of the patient: — The *terminations* of hypertrophy depend also very much upon the same circumstances. In its simple states, apoplexy and active hæmorrhages are its occasional consequences (§ 169.); but, if these result not from it, the patient may live many years. When hypertrophy is attended by much dilatation, the symptoms are more severe, and its course more rapid. It does not so frequently cause apoplexy as the foregoing state; but it is generally accompanied with greater disorder of the respiratory functions. Dr. HOPE remarks, that, when this form of the disease demands, owing to the palpitations and dyspnœa, periodical bleedings at short intervals, it hurries with an uninterrupted course to its fatal termination. In the majority of such cases, however, bleedings are not the appropriate means of alleviation.

180. Both the progress and termination of the malady, and consequently the prognosis, more especially depend upon the pathological causes and complications of it. When these consist of diseased valves or contracted orifices, the hypertrophy and dilatation usually proceed to a greater extent, and the balance of the circulation is more disturbed than in the simple form of the complaint. In such cases, congestions and even effusions of blood, or of serum, generally supervene, either in the substance of important viscera, or on venous or serous surfaces, and occasion various consecutive maladies, according to the particular lesion of the heart, and to the consequent seat of congestion, effusion, or infiltration of parenchymatous structures. Hence result pulmonary hæmorrhage, &c., œdema, or effusion into the bronchi, or into the pleural cavities, &c., followed by asphyxy. Abolition of the functions of the lungs causes stupor, or accelerates the alterations which often take place in the brain, especially congestion and sanguineous or serous effusions. Or these latter are the first to occur, especially when the primary lesion is in the right side of the heart (§ 169.).

181. *b. The prognosis*, it is evident from the foregoing, is generally *unfavourable*, especially in the more complicated cases, in proportion to the extent of lesion of the orifices and valves, and where hypertrophy is accompanied with adhesion of the pericardium. — Debility, age, a cachectic habit of body, and disease of the lungs, also increase the danger, or rather render it more imminent. — In the simple states and early stages of the malady, when the constitution is not impaired, and when the patient can be subjected to appropriate treatment, and is so circumstanced as to pursue it, the prognosis is much more *favourable*; and, although the alteration already existing may not be diminished, its progress may be arrested.

182. *G. TREATMENT.* — The circumstances which influence the terminations of hypertrophy, and the prognosis of it, should also control the treatment. The simple form of the malady, particularly in young and otherwise sound persons, requires very different means from the complicated, especially when occurring in broken-down constitutions: in the former, *vascular depletions* may be employed, and repeated from time to time; in the latter, they require great caution

